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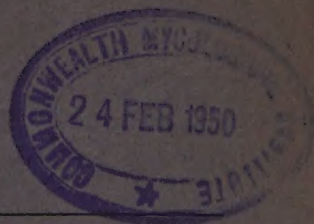
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THE VETERINARY BULLETIN

Vol. 19.]

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[No. 11.]

DISEASES CAUSED BY BACTERIA AND FUNGI

SMITH, W. (1948) **Factors concerned in the virulence and host specificity of staphylococci.** [Summary.]—*Proc. R. Soc. Med.* **41.** 427-428. 2622

S. considers mutation to be the major factor in the infectivity of the organism. Several factors affect the virulence of staphylococci, which is based chiefly on the invasiveness and toxigenicity of the organism. Coagulase helps to initiate infection and this is followed by α toxin in human infections and possibly by β toxin in animal infections. Leucocidin probably determines the severity and type of disease once infection is established while fibrinolysin and hyaluronidase may play a part in the development of the infection.—J. I. TAYLOR.

I. EISELE, C. W., McCULLOUGH, N. B., BEAL, G. A., & BURROWS, W. (1946.) **Development of brucella agglutinins in humans following vaccination for cholera.**—*Proc. Soc. exp. Biol. Med.* **61.** 89-91. 2623

II. EISELE, C. W., McCULLOUGH, N. B., BEAL, G. A., & ROTTSCHAEFER, W. (1947.) **Brucella agglutination tests and vaccination against cholera.**—*J. Amer. med. Ass.* **135.** 983-984. 2624

III. EISELE, C. W., McCULLOUGH, N. B., & BEAL, G. A. (1948.) **Brucella antibodies following cholera vaccination.**—*Ann. Int. Med.* **28.** 833-837. 2625

I, II & III. Following several experiments on over 190 individuals inoculated against cholera with one of two *Vibrio cholerae* vaccines—one containing the O antigen only and the standard U.S. Army vaccine containing both the H and the O antigens—it was established that in the great majority brucella agglutinins may be engendered in high titres by the H antigen. In a number, agglutinins and opsonins were demonstrable even after one year. Unless this fact is widely known, confusion may occur in the diagnosis of chronic brucellosis. As several million men were vaccinated against cholera during the war this finding is important.

Consideration is now being given to the possibility that cholera vaccine may be useful in immunological procedures with brucellosis, as the

prophylactic and therapeutic results obtained with it were at least as good as those obtained with a brucella vaccine; and there would also be obvious advantages over the latter in that subsequently it would be possible in part to differentiate between antibodies produced by this vaccine and those produced by a suspected brucella infection.

—F. A. A.

McCULLOUGH, N. B., EISELE, C. W., & BEAL, G. A. (1948.) **Antigenic relationship of *Brucella* and *Vibrio comma*.**—*J. infect. Dis.* **83.** 55-59. 2626

The authors had reported previously [see preceding abst.] that individuals immunized with the standard U.S. Army anti-cholera vaccine (HO antigen) developed antibodies for brucella. In this study they found by agglutinin-absorption tests that the H antigen of *V. cholerae* is present in varying degrees in the three species, *Br. abortus*, *Br. suis* and *Br. melitensis*.—J. I. TAYLOR.

MAUNDER, J. C. J. (1948.) **The control of tuberculosis in Queensland.**—*Aust. vet. J.* **24.** 313-319. 2627

The results of the first four years of a TB. eradication campaign in cattle in the areas supplying milk for consumption in the Brisbane area are described. The single intradermal test, using synthetic tuberculin injected into the caudal fold, was used; readings were made at 96 hours. All reactors were slaughtered. Infected non-reactors were encountered. The use of the complement fixation test in "problem herds" had been of doubtful value, except that strongly positive reactors to this test were frequently found to be infected. A short thermal tuberculin test (5 ml. synthetic medium tuberculin subcutaneously, temperature being taken at the 2nd, 4th, 5th and 8th hours) had been used in too few cases for its evaluation. During the four years the incidence of TB. was reduced from 15.87% to 0.92%.

—J. H. WHITEM.

MASON, E. F., KRIDELBAUGH, W. W., CROUCH, W. H., & WARD, M. (1949.) **Streptomycin in the treatment of tuberculous enteritis, a report of thirty-three cases.**—*Amer. J. med. Sci.* **217.**

28-46. [Authors' summary copied *verbatim*.] 2628

Thirty-three patients suffering from active pulmonary tuberculosis and a complicating tuberculous enteritis have been treated with streptomycin with striking improvement in all manifestations of the intestinal disease.

DRAGSTED, I. (1949.) **Avian tuberculosis in man.**—*Lancet*. 257. 103-105. [Author's summary slightly modified.] 2629

Between 1935 and 1948 tubercle bacilli of avian type were cultivated from 6 persons in Denmark.

In all cases the cultures showed characteristic pathogenicity for animals.

One patient died of the avian infection. Four patients had local lesions, which have now healed, and the sixth still has a fibrous pulmonary tuberculosis.

Two of the patients were examined with avian tuberculin, prepared from an avian strain of tubercle bacillus in the same way as P.P.D. Both gave a positive reaction with 0.00002 mg.

WELLS, A. Q. (1949.) **Vaccination with the murine type of tubercle bacillus (vole bacillus).**—*Lancet*. 257. 53-55. [Author's summary copied *verbatim*.] 2630

Two vaccination experiments with the murine type of tubercle bacillus are reported. Both were in closed institutional communities.

The first experiment, in a colony where the natural incidence of tuberculosis is low, revealed nothing as regards the efficacy of vaccination in raising resistance to tuberculosis.

The second experiment, in a colony where the natural incidence of tuberculosis is high, gave a statistically significant result. Eight cases of notified tuberculosis with four deaths, occurred in the control unvaccinated group, compared with one case and no death in the vaccinated group.

BIRKHAUG, K. (1949.) **Virulence and tuberculo-genic studies of sixty consecutive weekly lots of BCG vaccine produced by standard technique.**—*Amer. Rev. Tuberc.* 59. 567-588. [English and Spanish summaries. English summary copied *verbatim*.] 2631

Uniform methods are presented for the continuous production at weekly intervals of a relatively stable and effective BCG vaccine and for periodic control of its avirulence and tuberculo-genic properties.

A series of sixty consecutive weekly lots of BCG vaccine produced by such methods has been assessed quantitatively for invasiveness and the production of tissue hyperplasia in guinea pigs sacrificed three and six months, respectively, after inoculation. The data confirm that BCG's

avirulence is not absolute, but is of a significantly low and stationary degree to render the animals tuberculin hypersensitive.

The same lots of vaccine have been assayed for their tuberculo-genic properties, their ability to produce localized intracutaneous and trans-cutaneous skin lesions. The data indicate that this potency is significantly stable when the vaccine is prepared by the methods employed in this study.

Experience on more than 2,000 persons vaccinated with the material from these sixty consecutive weekly lots of BCG vaccine confirm the stability of BCG's tuberculo-genic potency and relative avirulence.

An international standard technique for the preparation of BCG vaccine and for the periodic control of its avirulence and tuberculo-genic potency is recommended.

MILLER, J. M., FAVOUR, C. B., WILSON, B. A., & UMBARGER, M. A. (1949.) **Nature of the plasma factor responsible for *in vitro* lysis of leucocytes by tuberculo-protein.**—*Proc. Soc. exp. Biol.*, N.Y. 71. 287-289. [Authors' summary copied *verbatim*.] 2632

There is present in the plasma of tuberculous humans a heat-labile, non-dialyzable component which is responsible for the *in vitro* lysis of washed leucocytes by tuberculo-protein. Further properties of this lytic producing substance are its stability at 10°C for at least 7 days and its precipitation with the globulin fraction of the plasma proteins.

YEGIAN, D., & VANDERLINDE, R. J. (1948.) **A quantitative analysis of the resistance of myco-bacteria to streptomycin.**—*J. Bact.* 56. 177-186. 2633

Previous workers having shown that small numbers of resistant individuals are present in susceptible populations of non-acid-fast bacteria independent of the presence of streptomycin, the authors studied cultures of *Mycobact. tuberculosis* and *M. ranae*.

They found that the number of variants is directly affected by the concentration of the streptomycin and that the incidence of variants increases with size of population, provided the concentration of the drug is constant.—M. W.

BEVILACQUA, E. B., & MCCARTER, J. R. (1948.) **The proteins in unheated culture filtrates of human tubercle bacilli. I. Fractionation and determination of physical-chemical properties.**—*J. exp. Med.* 87. 229-244. [Authors' summary copied *verbatim*.] 2634

MCCARTER, J. R., & BEVILACQUA, E. B. (1948.) **The proteins in unheated culture filtrates of human tubercle bacilli. II. Determination of**

serological properties. — *Ibid.* 245 – 258.

[Authors' summary copied *verbatim*.] 2635

I. Concentrated culture filtrates of two strains of human tubercle bacilli, a virulent and a slightly virulent one, have been fractionated to give fourteen fractions in each case. Chemical determinations and sedimentation velocity measurements have been carried out on those fractions for which significant results could be obtained. The evidence is that two distinct proteins are present, in addition to a polysaccharide and nucleic acid. The physical measurements have not demonstrated the presence of any other proteins. One of the proteins has been isolated in pure form, and found to have a molecular weight of $44,000 \pm 5,000$, based on measurements of partial specific volume, sedimentation velocity, and diffusion rate. This protein is believed to be the same as one previously isolated by Seibert *et al.*, who assigned it a molecular weight of 32,000. The other protein was not obtained sufficiently free from polysaccharide so that its molecular weight could be determined, but it is believed to have a sedimentation constant of about 2 S. Sedimentation and diffusion constants have been obtained for the polysaccharide, which appears to be a homogenous molecular species with a molecular weight of about 20,000. The source in unheated tuberculin of the proteins obtained from heated preparations is discussed.

II. Only two serologically different proteins were found in the unheated culture filtrates of both virulent and slightly virulent tubercle bacilli. One of them was the protein which had a sedimentation constant of 3.4 S, and the other was in filtrate fractions with a constant of 2 S.

That these proteins were distinct was demonstrated by three methods: quantitative precipitin and precipitin absorption tests with rabbit antisera, skin tests in guinea pigs actively sensitized with the culture filtrate fractions, and skin tests in passively sensitized guinea pigs.

A third antigen of unknown nature was found by means of the precipitin tests, but only in certain fractions from the virulent culture filtrate.

The protein with the constant 3.4 S could not be demonstrated serologically in an O.T. made from the same culture filtrate as the unheated preparation from the virulent organism.

HONKAPOHJA, H. (1947.) **Kirchner's method of cultivating tubercle bacilli.**—*Ann. Med. Exper. et Biol. Fenniae*. 25. 72–78. [Abst. in *Bull. Hyg., Lond.* 23. 125–126. (1948), slightly modified. Signed: CHARLES WILCOCKS.] 2636

The basic medium of Kirchner comprises two parts: (1) monopotassium phosphate 4 g., disodium phosphate 3 g., magnesium sulphate 0.6 g., sodium citrate 2.5 g., asparagine 5 g., glycerin

20 ml., distilled water 1,000 ml. This is autoclaved, and the pH is kept as 6.9–7.2. (2) serum (inactivated for 1 hour at 56°C. on 3 successive days). This is added to solution (1) in the proportion of 1 to 10. Of this mixture, portions of 5 ml. are measured into test tubes, and incubated to test for sterility.

About 2 ml. of the material (sputum, pus, urine, etc.) are poured into a centrifuge tube, and 4 ml. of 8 per cent. sulphuric acid are added and allowed to act, with frequent shaking, for 10–15 minutes. The tube is then filled with saline and centrifuged, and the culture is made from the sediment. Cultures from cerebrospinal fluid may be made without sulphuric acid. The author has tested this medium against Loewenstein's medium, with a large number of specimens, of which 48 proved to be positive with Kirchner and 80 with Loewenstein. The average time for cultures to become positive was 23 and 34 days respectively. These results may be unduly flattering to the Kirchner medium because the very large tubes which should be used with the Loewenstein medium, to ensure adequate oxygen after the tube has been sealed with paraffin, were not available. This is not important for the Kirchner tubes, which are not sealed, but are plugged with cotton.

In the Kirchner medium, tubercle bacilli of human type grow at the bottom, either in granular pinhead masses or in masses as large as a pea, or, later, as a surface film which may rise along the wall of the tube. The bovine type grows as a powdery turbidity, but the avian type is luxuriant and grows as a film from the beginning. The great drawback to the Kirchner medium is that it is readily contaminated, since it contains none of the usual inhibitory substances.

BLOCH, VON H. (1946.) [Metabolism of tubercle bacilli.]—*Schweiz. med. Wschr.* 76. 1179.

[Abst. in *Amer. Rev. Tuberc.* 55. No. 5. p. 156–157 of absts. (1947), copied *verbatim*.

Signed: H. MARCUS.] 2637

Experiments concerning the respiration and growth of tubercle bacilli demonstrated that these two functions are largely independent. Certain substances augment the respiration of tubercle bacilli and at the same time increase their growth and multiplication; certain substances increase the respiration without affecting growth; other substances, while increasing the respiratory processes, depress or abolish multiplication. A substance of the latter order is sodium salicylate. Five different groups of substances are evaluated with respect to their capacity for affecting the respiration and growth of tubercle bacilli. The substances tested were primary amines and their derivatives, heavy metal compounds, sulphonamides, disinfectants and fatty acids. Results

show that three different effects on tubercle bacilli were obtained. Heavy metal compounds, disinfectants and fatty acids produced their effects by irreversible damage to the bacterial cell. The respiration of the cell body was also severely damaged by these substances. The sulphonamides produced bacteriostasis of a nonspecific and reversible nature. In the presence of suitable antagonistic substances (p-aminobenzoic acid) the effect could be completely annulled. The effect of the sulphonamides on tubercle bacilli is no different from that produced on other microorganisms. Cell respiration and the ability of the single cell to grow remains unimpaired, but division of cells, mitosis and multiplication are stopped. Of special importance is the action of the primary amines. These produced specific reversible effects on the multiplication of tubercle bacilli, without affecting respiration and growth. These substances had no effect on other microorganisms, but their effectiveness was from six to eighty times that of a 0.0002 molar solution of sodium salicylate.

FEENSTRA, E. S., THORP, F., & GRAY, M. L. (1949.) **Pathogenicity of *Corynebacterium renale* for rabbits.**—*Amer. J. vet. Res.* 10. 12-25. 2638

The authors report the pathogenesis of experimental *Corynebact. renale* pyelonephritis in the rabbit. In the first experiment 15 rabbits were inoculated intravenously with a culture of the organism. Selected case reports of individual rabbits are given, describing the macroscopic and microscopic lesions produced and the results of cultural examinations. Eight further rabbits were used to investigate more precisely the changes during the first four days after inoculation. Useful photomicrographs are included. The lesions are very similar to those found in natural cases in cattle and also to those described by LOVELL & COTCHIN [*V.B.* 17. 459] in experimental pyelonephritis in mice.—J. SCARNELL.

MILLER, W. R., PANNELL, L., & INGALLS, M. S. (1948.) **Experimental chemotherapy in glands and melioidosis.**—*Amer. J. Hyg.* 47. 205-213. [Authors' summary copied *verbatim*.] 2639

Sodium sulphadiazine, sodium sulphathiazole, and streptothricin were found bacteriostatic for *Malleomyces mallei* [*Pfeifferella mallei*] in vitro in concentrations which can be obtained therapeutically. Streptothricin in its present form, however, was not suitable for parenteral administration because of its high toxicity. Streptomycin, although nontoxic, was not nearly as effective as streptothricin. Sodium sulphadiazine was very effective in the treatment of acute experimental glands and melioidosis in hamsters. Prolongation of therapy from 7 to 20 days increased the

recovery from 50 per cent or less to 100 per cent. Streptomycin and penicillin were without significant effect in the treatment of these diseases in hamsters.

BLAXLAND, J. D., KERSHAW, G. F., & HOWELL, D. (1949.) ***Erysipelothrix rhusiopathiae* infection in turkeys.**—*Vet. Rec.* 61. 350-352. 2640

Two outbreaks are recorded affecting turkeys 6-7 months old. The symptoms were not diagnostic. Possible sources of infection are discussed.—D. LUKE.

ZINSLI, P. (1947.) Erfolgreiche penicillinbehandlung bei einer schweren Allgemeinerkrankung nach Erysipeloid. [A severe generalized erysipeloid infection successfully treated with penicillin.]—*Schweiz. med. Wschr.* 77. 1201-1203. [Abst. in *Bull. Hyg., Lond.* 23. 108. (1948), copied *verbatim*. Signed: J. C. CRUICKSHANK.] 2641

A butcher who had become infected with *Erysipelothrix rhusiopathiae* while slaughtering a pig developed lesions on one hand, accompanied by high fever and other constitutional signs. The condition appeared to respond rapidly to the intramuscular administration of penicillin in a total dosage of 4.1 million units, 320,000 units being given twice daily until the temperature was normal.

EIELAND, E. (1947.) Tre tilfeller av infeksjon hos gris med *Pasteurella* (Bacterium) pseudotuberculosis rodentium. [Three cases of *Pasteurella pseudotuberculosis rodentium* infection in pigs.]—*Norsk VetTidsskr.* 59. 85-90. [Abst. from English summary.] 2642

The clinical appearances of three poorly fed pigs infected with *Past. pseudotuberculosis rodentium* are described. Pure cultures were obtained from the mesenteric lymph nodes. Two of the pigs had in addition pulmonary affections caused by *P. suis* septica.

Attempts to produce the disease in three other pigs, one of which was fed live *P. pseudotuberculosis* cultures, the remaining two being given intravenous injections, were unsuccessful.

It is stated that by improving the nutrition and by the use of *P. suis* septica antiserum the incidence of the disease was controlled.—E. G.

PARDI, M. C., & SANTOS, J. A. (1947.) Ossificação pulmonar e calcificação vascular em bovinos do pantanal Matogrossense. ["Enquê". Pulmonary ossification and vascular calcification in cattle in Brazil.]—*Veterinaria, S. Paulo.* 1. No. 3. pp. 3-7. 2643

In an abattoir in Sao Paulo, it was found that 5.24% of the cattle slaughtered were affected with pulmonary ossification. The animals were between three and nine years of age, and were

reared mainly in marshy regions of the country. Affected cattle often had vascular calcification (particularly in the aorta and valves of the left heart), pulmonary emphysema, and lesions grossly resembling interstitial nephritis.

A chemical analysis of the ossified lung compared with normal lung revealed 14.15% ash in the former and 0.98% in the latter. A detailed analysis of the minerals in the ash is given.

The condition resembles entequê, or the chronic form of pasteurellosis described by Lignières in Argentina.—I. W. JENNINGS.

JONES, J. C., & ANDERSON, G. W. (1948.)

Sulfamerazine in the treatment of a pseudomonas infection of turkey poults.—*J. Amer. vet. med. Ass.* 113. 458-459. 2644

Sulphamerazine at 0.5% was not effective in controlling a natural outbreak of *Pseudomonas* infection in turkey poults in which there was a high degree of morbidity at the time the drug was administered. At 0.75% it seemed to be effective in controlling an outbreak when administered before morbidity had reached approximately 5% in any of the affected groups. Success probably ensued as a result of early diagnosis and prompt treatment.—C. HORTON SMITH.

WICKHAM, N. (1948.) *Salmonella cambridge* infection in a cat.—*Aust. vet. J.* 24. 337. 2645

S. cambridge (III, XV . . . 1, w ↔ e, h.) was isolated from the mesenteric lymph nodes of a cat which died after a short illness. Lesions comprised congestion of visceral organs and lymph nodes, focal hepatic necrosis, submucous intestinal and subepicardial petechiae and scattered foci of pneumonia.—J. H. WHITTEM.

GWAKTIN, R. (1949.) **Studies in pullorum disease. XXIII. Infection of adult turkeys by mouth and by contact with infected hens.**—*Canad. J. comp. Med.* 13. 102-108. [For part XXII, see *V. B.* 19. 194.] 2646

The results of a previous experiment in which poults and young chicks were infected orally with *Salmonella pullorum* are reviewed briefly, after which supplemental studies dealing with agglutinin response and persistence of reaction in adult turkeys infected *per os* and by contact are discussed.

Thirty-five adult turkeys exposed as poults to pen infection with negative result developed agglutinins in seven days when infected orally with a broth culture. With one exception, antibodies had disappeared from their blood 146 days later. *S. pullorum* was recovered from four out of five that died during the positive stage, but not from twelve which died or were killed for examination after becoming negative to the agglutination test. *S. pullorum* was also isolated from four out of 408

eggs, three of which contained dead embryos, during the positive phase, but poults that hatched were free from infection. In another experiment, 10 eight-month-old turkeys were placed in contact with 31 chickens of the same age that had been infected as day-olds with *S. pullorum* of turkey origin. In six there was slight but transient agglutinin production, but none remained infected. Three of six control chickens in the same house died too soon for infection to become established, while the remaining three reacted positively, *S. pullorum* being isolated from two.

These experiments suggest that under certain conditions adult turkeys may throw off infection but may lay infected eggs while harbouring the organism. If this is true under natural conditions chronic ovarian infection is not as important a source of infection as it is in chickens. There is the further suggestion that adult turkeys may become infected by contact with infected hens, and while infection was not lasting in these birds this source of infection might under suitable circumstances be responsible for the production of infected eggs.—A. B. WICKWARE.

KOKKO, U. P. (1947.) En gastroenterit epidemi förorskad av *S. enteritidis* var. *danyssz*. [An epidemic of gastro-enteritis caused by *S. enteritidis* var. *danyssz* (Ratin).]—*Nord. Med.* 36. 2325-2326. [English summary. Abst. in *Bull. Hyg., Lond.* 23. 163. (1948), copied *verbatim*. Signed: D. J. BAUER.] 2647

In the spring of 1938 an outbreak of gastro-enteritis occurred in a hospital in Helsinki. There were 430 cases in all, only two persons from among the patients and staff escaping the infection. The onset of the epidemic was very rapid, and two-thirds of the cases had appeared by the second day. The duration of the disease was 48 to 72 hours, being longer than one week in only 5 per cent. of cases. Specimens from 28 patients were examined bacteriologically. In eight instances an organism of the *Salmonella* type was isolated, which agglutinated *Salm. enteritidis* (Jena) antiserum to the limit of the homologous titre, absorbing from it all the agglutinins.

Agglutination reactions were performed on sera from 62 patients, and it was found that agglutinins appeared as early as the first week of the disease.

The epidemic was undoubtedly spread by milk, which was a common article of diet and which had not been consumed by the two persons who escaped infection. The milk came from a farm where the preparation "Ratin" had been used, which contains *Salm. enteritidis* var. *Danyssz*. However, direct contamination with this preparation could not be demonstrated with certainty.

LAHELLE, O. (1947.) *Necrobacterium*. A study

of its bacteriology, serology and pathogenicity, and its relation to fusobacterium. pp. 361. København: Ejnar Munksgaard. *Acta. path. microbiol. scand.* Suppl. 67. Numerous tables and references. 2648

Twenty strains of the necrosis organism were studied comprehensively. Comparison was made with *Fusobacterium* and the general characters were described in detail.

The organism had a complex antigenic structure, but produced antibodies readily. There was cross-agglutination with *Fusobacterium*.

A strong haemotoxin developed in broth containing peptone; it was strongest after 18 hours' incubation and was very thermolabile, e.g., it was destroyed at 56°C. for 30 min.

All of the strains were pathogenic to mice, but the virulence varied considerably from strain to strain. If the mice lived for 2-3 days hepatic abscesses and necrotic areas developed, but no such lesions were found in the more acute cases. In the latter the organisms could be recovered from heart blood, spleen and peritoneum.

An historical review of the subject is given and there is a chapter on the classification of the organism and its relation to *Fusobacterium*. Both belong to the Bacteriaceae but are in two different genera. L. used the name *Necrobacterium* for the organism.

There are 122 tables and several photomicrographs.—L. G. DONALD.

BASS, H. E., SCHOMER, A., & BERKE, R. (1949.) Question of contagion in coccidioidomycosis study of contacts. [Human.].—*Amer. Rev. Tuberc.* 59. 632-635. 2649

It is believed that in the work described in this article additional evidence has been obtained that coccidioid infection from man to man does not occur.

ZAHN, D. W. (1949.) Pulmonary infiltration associated with sensitivity to histoplasmin. Report of a case.—*Amer. Rev. Tuberc.* 59. 636-642. 2650

Cases of pulmonary calcification in man in certain parts of the U.S.A. have been found to be the result of *Histoplasma capsulatum* infection and not of tuberculosis. Z. describes a case with non-tuberculous pulmonary change in which the tuberculin reaction was negative, but the histoplasmin reaction was positive.

SAUNDERS, L. Z. (1948.) Cutaneous blastomycosis in the dog. A case report.—*N. Amer. Vet.* 29. 650-652. 2651

An account of a case of *Blastomyces dermatitidis* infection in a spaniel dog. There was laceration of the foot and on one ear a growth which was removed and a week later the dog

became unwell with some fever. After another week an ulcer developed on the foot, followed by an ulcer on the back on the following day. The breath became foul and after another week a large fluctuating swelling developed in the inter-mandibular space. There were two ulcers on the surface of the swelling and by this time elsewhere on the body. An account is given of the growth removed from the ear and organisms considered to be blastomycetes were demonstrated microscopically. The dog died after an illness of 18 days. It was not possible to make a P.M. examination.—MALCOLM WOODBINE.

LYAPUSTIN, A. K. (1946.) [Ammargen therapy of leptospirosis in bovines.].—*Veterinariya, Moscow*. No. 8-9. pp. 7-8. 2652

Of 10 affected bovine animals given "ammargen" intravenously in dilutions of 1:1,000 or 1:500 at a dose rate of 0.5-0.8 mg. per kg., two recovered; of 27 given 0.8-1.2 mg. per kg., 20 recovered and of 46 treated symptomatically only six recovered. Of 90 head of cattle moving 25-45 km. per day in hot weather and given one mg. per kg. in two fractions within 2-4 hours 49 (55%) recovered, but under similar conditions, of 49 cattle given 1 mg. per kg. of a 1:500 solution at a single administration 39 (80%) recovered.

L. concluded that "ammargen" administered intravenously in a 1:500 solution at a dose rate of 1 mg. per kg. was satisfactory treatment against bovine leptospirosis.—A. MOLDAWSKY.

OLITZKI, L., STUCZYNSKI, L. A., HALEVI, C., & BERNKOPF, H. (1949.) Immunological studies on bovine leptospirosis.—*J. infect. Dis.* 84. 15-20. 2653

Using leptospira isolated from cattle [V. B. 17. 466], it was found that the injection of formalized bovine leptospiral vaccine into calves stimulated immunity to a moderate challenge infection, but not to a more severe infection. The injection of living *Leptospira grippotyphosa* suspension, followed three weeks later by a challenge dose of the bovine strain, resulted in some alleviation of the typical symptoms and reduced the mortality, but did not confer a solid immunity.

The best results in immunization were obtained by repeated inoculations of living *L. grippotyphosa* suspension, or by the use of formalized bovine strain vaccine, followed by an injection of live virulent bovine leptospira. There were wide differences in the ability of individual animals to produce antibodies.

Potent antisera were produced in cattle and donkeys only by immunization with living organisms. These sera, injected at the height of infection, exerted a curative effect in two out of three calves, but even then, the animals were not solidly immune to further infection.—I. W. JENNINGS.

RANDALL, R. (1948.) **Canine leptospirosis.**—*J. Amer. vet. med. Ass.* 112. 136-139. 2654

R. states that leptospirosis in the U.S.A. is probably more common than was once thought. *L. canicola* infections are more common than *L. icterohaemorrhagiae*. The disease occurs in sporadic and enzootic forms.

The clinical manifestations, diagnostic procedures, treatment and prophylaxis are all discussed.—A. R. JENNINGS.

WEETCH, R. S., COLQUHOUN, J., & BROOM, J. C. (1949.) **Fatal human case of canicola fever.**

See also absts. 2706 (staphylococcal bacteriophage); 2718 (streptococci); 2806 (salmonellosis); 2832-2835 (annual reports).

—*Lancet*. 256. 906-907.

2655

The patient, a woman, had been in close contact with a dog which was later shown to have been harbouring *Leptospira canicola* in its kidneys.

The woman died from uraemia due to an acute interstitial nephritis superimposed upon a chronic nephritis. Penicillin had no effect upon the course of the disease.

The dog, which was killed, had never been obviously ill. At P.M. examination there were no gross lesions. The dog's serum had a titre of 1:300 for *L. canicola*.—A. R. JENNINGS.

DISEASES CAUSED BY PROTOZOAN PARASITES

SCHEFF, G. J., & THATCHER, J. S. (1949.) **The role of potassium as cause of death in experimental trypanosomiasis.**—*J. Parasit.* 35. 35-40. 2656

The ultimate cause of death in experimental trypanosomiasis has been a matter of controversy, one suggested primary cause being the observed elevation in the potassium level of the plasma. This possibility was investigated, using rats in which potassium tolerance had been induced experimentally since it was reasoned that such rats might be unusually resistant to *Trypanosoma equiperdum*. It did not appear that there was any variation in resistance between the potassium tolerant and the normal rats.—S. BRIAN KENDALL.

WARGACKI, R. (1949.) **Spostrzeżenia nad przebiegiem, zapobieganiem i zwalczaniem zarazy stadniczej koni w województwie poznańskim. [Epidemiology, prophylaxis and treatment of Trypanosoma equiperdum infection in the district of Poznan (Poland).]**—*Ann. Univ. M. Curie-Skłod. Sect. DD.* 4. pp. 59-74. [English summary.] 2657

During and after the war *T. equiperdum* infection became very frequent. Compulsory serological examination of all horses and slaughter of severe and isolation of mild cases was ordered by the government.

Neosalvarsan, naganol, naganin and penicillin were tried. Best results were achieved with two intravenous injections of 18 g. each of neosalvarsan. Penicillin treatment was ineffective.

In 81 out of 119 mares treated with neosalvarsan, symptoms of the disease could not be detected for periods varying between a few months and one year. In 103 mares the complement-fixation test was negative after treatment.—E. G.

RAY, H. N., & HARBANS, S. (1948.) **Effect of pantothenic acid on the infection of Trypanosoma evansi in rats.** [Correspondence.]—*Nature, Lond.* 162. 849. 2658

The effect of a diet deficient in pantothenic acid on the course of experimental infections with *T. evansi* in rats was studied in three experiments on a total, including controls, of 22 rats. In all three experiments the rats receiving no pantothenic acid developed a more intense infection and died after a somewhat shorter interval than those on a diet supplemented with pantothenic acid. The authors tentatively suggest that pantothenic acid exerts an influence on the rate of multiplication in rats although finally the host is overwhelmed. Surra in cattle in India is generally a chronic asymptomatic infection although on occasion fatal outbreaks occur; the authors speculate on the possible relationship of disturbances in the pantothenic acid balance with such fatal outbreaks.

—M. C.

DANIEL, G. E. (1948.) **Observations on the pH of a culture medium and on cultures of Trichomonas foetus.**—*J. Parasit.* 34. 496-504. 2659

The experiments were made in an attempt to explain random variations in the hydrogen ion concentration of medium used for the cultivation of *Tr. foetus*.

The medium used contained no blood serum, and was composed of an egg and liver slant covered with saline. Routine transfers of *Tr. foetus* were made at intervals of 10-14 days.

There was a wide variation in the pH of the medium before and after autoclaving. Also the variation in pH from top to bottom of the covering saline was marked. In this type of medium it is not possible to distinguish accurately between changes in pH due to the activity of the trichomonads and those changes due to the inherent instability of the medium. Cultures of *Tr. foetus* which died had pH values of 6.18-5.09.—G. M. U.

JAQUETTE, D. S. (1948.) **On the nomenclature of Trichomonas gallinae, a protozoan parasite of birds.**—*Proc. helminth. Soc., Wash.* 15. 68-72. 2660

J. discusses the nomenclature of the flagellate found in the upper digestive tract and liver of pigeons, fowls and certain other birds. He concludes that the synonyms of *Tr. gallinae* given by PEREIRA & DE ALMEIDA (1948) [*Arq. Inst. Biol. Sao Paulo*. 14. 273-292] appear to be correct. The species referred to as *Tr. columbae* and its synonyms as given by the above authors [*Ibid.* p. 284] are incorrect and probably refer to a species *Hexamita*. *Tr. gallinae* is, therefore, the only trichomonad known by J. to infect pigeons.

—G. M. URQUHART.

WAKSMAN, S. A., HARRIS, D. A., KUPFERBERG, A. B., SINGHER, H. O., & STYLES, H. (1949.) Streptocin, antibiotic isolated from mycelium of *Streptomyces griseus*, active against *Trichomonas vaginalis*, and certain bacteria.—*Proc. Soc. exp. Biol.*, N.Y. 70. 308-312. 2661

The authors found an antibiotic — streptocin, distinct from actidione and streptomycin, in an ether-soluble fraction prepared from the mycelial growth of *Streptomyces griseus*.

The maximum yield of the antibiotic was obtained on the fifth day in an unshaken medium consisting of glucose, peptone, meat extract and NaCl in tap water.

Emphasis is directed towards the strong trichomonacidal properties against *Trichomonas vaginalis* and *Tr. foetus* in *in vitro* tests; streptocin is also active against Gram-positive organisms.

—A. E. PIERCE.

FARR, M. M., WEHR, E. E., & JAQUETTE, D. S. (1948.) An outbreak of hexamitiasis in turkeys in Virginia.—*Proc. helminth. Soc., Wash.* 15. 42. 2662

Investigating the cause of mortality in turkey poults the authors found intense inflammation of the upper small intestine, where large numbers of *Hexamita meleagridis* were present. Presumably, the poults were infected by ingestion of parasites passed in the faeces of adjacent older birds. The condition was reproduced experimentally.

—G. M. URQUHART.

HORTON SMITH, C. (1949.) The acquisition of resistance to coccidiosis by chickens during treatment with sulphonamides.—*Vet. Rec.* 61. 237-238. 2663

Coccidiosis is best controlled by permitting an ever-present low grade infection by means of which resistance may be acquired. The author describes possible ways by which resistance can be attained without endangering the health and survival of the host. Certain sulphonamides are highly effective in controlling established coccidial infections by their suppressive action on the second generation schizonts. While the chick is protected it develops at the same time a resistance

which is apparent about 15 days after the initial infection. The older method of controlling disease in a natural outbreak (in which at any one time different chicks are at different stages of the disease) was by three one-day feedings of 1% sulphaguanidine in the food, allowing four days between treatments. A more recent method of control is to use sulphamerazine at the rate of one gramme per pound of dry mash for the first six days during which the chicks are exposed to infection. Preliminary work using sulphamethazine indicates that treatment need not be started until the second day of exposure to infection and from 3-5 days' treatment is sufficient to cover all grades of infection in an infected flock.—S. B. K.

KOUTZ, F. R. (1948.) Immunity studies in avian cecal coccidiosis. 1. The value of drugs to establish immunity in young chickens.—*Amer. J. vet. Res.* 9. 388-395. 2664

Chicks become immune to caecal coccidiosis from ingestion of numbers of sporulated oocysts or following recovery from a severe attack of the disease. Sulphonamides have been used to prevent coccidiosis as well as to allow chicks to develop sufficient immunity to protect them from a later attack of the disease. Although there are advantages in the use of drugs in permitting chicks to develop resistance with safety, K. points out some disadvantages. In heavy infections large caecal cores are developed together with other tissue changes which later result in losses or unthriftiness; the ingestion of oocysts and consumption of medicated feed and water vary in different groups of chickens; the degree to which a yard is infected varies greatly owing to different weather conditions and output of oocysts. The weight losses due to the use of some drugs are of importance. K. also maintains that in different groups of chickens there are variations in the protection afforded by the same drug. Of the drugs tested, *i.e.*, sodium sulphamerazine, sodium sulphamethazine, sulphaquinoxaline and sodium borate, the sulphaquinoxaline groups yielded the best results. Immunity tests were made weekly on chicks under natural exposure conditions and given sulphaquinoxaline in the feed. Complete immunity was developed in all groups in the fifth week; in the controls immunity was developed after the first week. Three-week-old chicks receiving 0.0125% and 0.05% sulphaquinoxaline in the feed for seven weeks had similar weight gains. In a group receiving 0.1% sulphaquinoxaline there was a loss in weight and a reduced food consumption.—C. HORTON SMITH.

GRUMBLES, L. C., & DELAPLANE, J. P. (1948.) Relative activity of sulfamethazine and sulphaquinoxaline against *Eimeria tenella* infection in

young chickens.—*Amer. J. vet. Res.* 9. 306–309. 2665

Four experiments, involving 740 chickens, three weeks old, are described in which the relative activity of sulphamethazine and sulphaquinoxaline against *E. tenella* infection was studied. Mortality was the main criterion in the evaluation of the drugs. It was found that sulphaquinoxaline used at various concentrations (0.0125–0.05 % in feed) was 3–4 times as effective as sulphamethazine when medication was started 72 hours after inoculation. Field data supported the laboratory findings when the drugs were used prophylactically for chicks, one to eleven and a half weeks old.—G. URQUHART.

DELAFLANE, J. F., BATCHELDER, R. M., & HIGGINS, T. C. (1947.) Sulphaquinoxaline in the prevention of *Eimeria tenella* infections in chickens.—*N. Amer. Vet.* 28. 19–24. 2666

Sulphaquinoxaline was found to be of considerable value in controlling *E. tenella* infections in chicks. The drug administered in the feed at 0.1 % prevented mortality in contrast to a 70–100 % mortality amongst untreated control chickens. There were indications of slight caecal haemorrhage in four of 17 birds. The drug was equally effective whether used one day before or two days after inoculation. At 0.05 % good control was also obtained when given as late as 72 hours after infection. Good results were also obtained under farm conditions when 11,500 young chickens were given 0.05 % in the feed for four days and again after four days on regular feed. One group of 926 chicks was kept on this schedule for six weeks. In another group of 1,063 chickens deaths occurred before treatment was started. A third group of 1,119 chicks was fed 0.033 % of the drug for five weeks. No deaths occurred. Twenty chickens from each of three pens were challenged with 60,000 oocysts; no deaths occurred during a 6–7-week period of observation when 0.05 % sulphaquinoxaline had been used. In a group that had received 0.033 % drug for five weeks, one death and much caecal haemorrhage resulted. Sulphaquinoxaline does not interfere with the development of a considerable degree of resistance to coccidiosis.—C. H. S.

BUER, A. W. (1946.) Forsøk med "Avomin" mot koksidiøse hos kanin. [Trials with "avomin" (resorein-monobutylether-diethyl-carbamate against coccidiosis in rabbits).—*Norsk VetTidsskr.* 58. 414–417. [English summary.] 2667

Thirteen rabbits infected with coccidia [species not stated] but not clinically ill, were treated with "avomin" without effect, as judged from faecal examination.—J. EDWARDS.

JUSSIAINT. (1948.) La piroplasmose du porc au Congo Belge. [Porcine piroplasmosis in the Belgian Congo.]-*Bull. agric. Congo belge.* 39. 631. 2668

A case of porcine piroplasmosis in a Large White, confirmed by blood examination, was cured by intravenous injection of 10 ml. of 50 % trypanblue.—E. PARKER POLLARD.

GRIMPRET, J. (1948.) Quelques protozooses animales en clinique vétérinaire au Maroc. [Protozoan infections of animals in Morocco.]-*Cah. Méd. vét.* 17. 65–77. 2669

G. gives a general account of the most important diseases caused by protozoa in Morocco, together with the appropriate treatment.

Three types of theileriasis (*Theileria dispar*) are recognized; a first attack (in imported stock), a relapse, and a recurrence. The latter occurs in acclimatized stock after a fresh massive infection and is often fatal. Gonacrine [3,6-diaminomethyl acridinium chloride] is given in 5 % solution as an intravenous injection of 20 ml. per animal; higher doses may be given to large animals. Zothelone [N,N'-dimethylquinolylium-methyl sulphate-6-urea] is widely used as a febrifuge, but has no action on the parasites. Lomidine [a guanidine derivative] introduced in 1947, is used in a 5 % solution (which is unstable) and administered by intravenous or intramuscular injection at 1–3 g. per animal. It is a febrifuge, but may not give a clinical cure if used alone; it is preferably employed as a simultaneous injection with gonacrine. *B. berbera* infection is less common in cattle; it is treated by intravenous injection of gonacrine (1–2 g.), either alone or in conjunction with zothelone. The latter is given by intramuscular injection in a dose of 2 ml. per 100 kg. body weight. Bovine anaplasmosis (*Anaplasma marginale*), which is usually the chronic form, has been increasing during recent years; it often occurs in conjunction with theileriasis. Gonacrine is only effective for first attacks, and subsequent treatment is aimed mainly at controlling the anaemia. True bovine piroplasmosis is easily diagnosed; it may be treated successfully with trypanblue, but gonacrine, which is effective against various piroplasms, is usually employed in Morocco.

In ovine piroplasmosis *Babesia ovis* infection is typically a disease of the hot season. Both acute and sub-acute forms occur. Treatment is by intravenous injection of 3–4 ml. of a 5 % solution of gonacrine or 1 ml. of zothelone. Anaplasmosis (*Anaplasma ovis*) is not distinguishable clinically from *Babesia ovis* infection and the two diseases may occur together. The mortality with anaplasmosis which may be enzootic, is high; young

animals are usually affected at the end of the summer. When the incidence in a flock is low, intravenous injections of gonacrine at 0.1–0.15 g. are recommended; alternatively, 5% solution of lomidine, freshly prepared, may be given intramuscularly in 8 ml. doses. This drug is effective in enzootics, but although the first dose prevents death, a second or even third dose may be necessary to obtain a clinical cure. Theileriasis is rare in Moroccan flocks, but is found in imported animals in May and June. Intravenous injections of 0.2 g. gonacrine are effective if given early enough, but tonics and stimulants are also necessary.

In equine piroplasmosis even indigenous stock are frequently affected. Infections of *Piroplasma caballi*, which may lead to congestion of the lungs and pneumonia, are easily diagnosed. A single intravenous injection of 1 g. gonacrine is effective, but abnormalities of the heart are a contra-indication for this drug. In mules, *Babesia equi* is the commonest infection; in acute cases, differentiation from *B. caballi* infection may be difficult. Gonacrine provides an effective treatment.

Canine piroplasmosis occurs frequently and is treated with trypanblue and zothelone.

Equine trypanosomiasis, dourine (*Trypanosoma equiperdum*) occurs frequently in Morocco. It is transmitted by roving donkeys and enzootics do not occur. Two 16 g. doses of novarsenobenzol [neoarsphenamine] are injected intravenously at a 48 hours' interval. The following routine is recommended to permit the retention of infected sires for breeding: (1) prophylactic treatment of stallions and breeding donkeys with naganol [suramin], (2) provision of diagnostic facilities for the complement fixation test, and (3) treatment of valuable infected breeding animals with novarsenobenzol.

Bovine trypanosomiasis does not occur in Morocco.

Canine leishmaniasis is widespread in the Mediterranean basin and is relatively simple to diagnose. In Morocco it is believed to be transmitted to man by *Phlebotomus* spp., and a canine source of infection should be sought when human cases occur. Treatment with anthiomaline or pentastib [tri- and pentavalent compounds of antimony] gives good results, but the effect is not lasting and the animal usually succumbs to a second attack 12–18 months later. Lomidine appears to be very effective, but it is not yet known whether relapses occur with this drug.

The occurrence of rickettsia infections in both sheep and cattle is suspected in Morocco, although the causal organisms have not been detected.

An unspecified disease in pigs, suspected to be a piroplasmosis, is described; it does not respond to gonacrine or zothelone therapy, but quinine preparations give good results.

During the hot season, a disease characterized by complete inappetence and a raised temperature occurs frequently in dogs. They die without further symptoms and no causal organism has been detected. Intramuscular injections of 2–3 mg. lomidine per kg. body weight, repeated every 48 hours for 8–10 days, are of value.—E. P. P.

JUSSIAUT. (1948.) L'anaplasmosse ovine au Congo Belge. [*Anaplasmosis in sheep in the Belgian Congo.*]—*Bull. agric. Congo belge.* 39. 627–631. 2870

Two outbreaks of a disease in both indigenous and imported Persian sheep in two districts in the Belgian Congo are described. Cases observed and controlled transmission experiments revealed the following characteristics. After an incubation period of about 13–14 days, the temperature was usually above normal with intermittent rises to 40°C. or more. The conjunctival mucosa was pale, but without signs of icterus, and severe, progressive emaciation occurred. P.M., a yellowish coloration of the liver was a constant finding, the mucosa of the gut was congested, and there were occasionally small petechiae on the heart; in acute cases the spleen was enlarged.

Lambs up to three months old were resistant to both natural and artificial infection. The susceptibility of indigenous stock appeared to vary in different districts, but was always less than that of imported breeds. Any upset in normal physiological processes could provoke individual cases or an epidemic. No successful treatment was discovered.

Heartwater was eliminated from the diagnosis, and the occasional discovery of inclusions resembling anaplasma in red blood corpuscles led to a diagnosis of ovine anaplasmosis.

Control of the tick vectors by routine dipping and avoiding grazing on pastures suitable for ticks is recommended.—E. PARKER POLLARD.

SJOLTE, I. P. (1947.) Toxoplasmosis canis. [*Canine Toxoplasma infection.*]—*Skand. Vet-Tidskr.* 37. 501–517. [English summary.] 2871

In 1947 S. demonstrated *Toxoplasma gondii* in a dog in Denmark. The clinical symptoms of the infection were atypical. P.M. examination revealed numerous ulcerations in the stomach and the small intestine and miliary pneumonic foci disseminated in the lungs. The lymph nodes of the affected organs had undergone changes which resembled tuberculous caseation. Characteristic conglomerations of *Toxoplasma* were found in the tissues, particularly round the ulcerations of the

stomach and the small intestine. Sections gave the clearest picture when stained with haematoxylin and eosin soluble in alcohol.

See also absts. 2832-2835 (annual reports).

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

FRENKEL, H. S. (1949.) **Histologic changes in explanted bovine epithelial tongue tissue infected with the virus of foot-and-mouth disease.**—*Amer. J. vet. Res.* 10. 142-145. 2672

A method adopted for the cultivation of the F. & M. disease virus on deep explants of bovine tongue mucosa is described, and an account given of the histological changes which are observed.

These changes, occurring in the absence of a vascular system, closely resemble those seen in the formation of vesicles in the living animal, vesicular formation also being observed histologically in the tissue explant.

In both cases a colliquative necrobiosis of the deeper layers of the stratum spinosum is followed by the filling of the area with fluid, blood serum in the case of the living animal and nutrient medium in the case of the explant. The stratum germinativum is rarely involved and this would account for the rapid healing of the majority of mouth lesions.

A method of differentiating the virus types involving the addition of specific immune serum to the culture medium, with subsequent observation for the inhibition of the formation of lesions, is being investigated.—H. H. SKINNER.

HENDERSON, W. M., & BROOKSBY, J. B. (1948.) **The survival of foot-and-mouth disease virus in meat and offal.**—*J. Hyg., Camb.* 46. 394-402. [Authors' summary copied *verbatim*.] 2673

Quantitative studies have been made of the survival of foot-and-mouth disease virus in beef and beef offals after storage at temperatures employed in the imported-meat trade.

The survival of virus is closely associated with the hydrogen-ion concentration of the tissue; thus the acidity of rigor mortis of muscular tissue rapidly causes inactivation. Quick-freezing of beef suspends acid formation and active virus was demonstrated for so long as the meat was kept frozen.

Thawing of quick-frozen meat initiates the suspended acid formation at an accelerated rate and rapidly produces a medium unsuitable for virus survival.

Liver, kidney, rumen, lymph node and blood from diseased cattle have all been shown to be highly infective and to remain so if stored frozen. Acid formation in these tissues and in blood is not on the same scale as in muscle, and prolonged survival of virus is more likely even with delay

The P.M. findings suggested an infection of the alimentary tract. The lesions were too recent to be regarded as congenital.—E. G.

in freezing and after thawing. This remains true of lymph node and of residual blood in vessels of a carcass in which the development of rigor mortis is complete.

Feeding of infective offal to swine under experimental conditions resulted in the appearance of the disease.

The significance of these observations is discussed in relation to the distribution of these products constituting a risk of spreading foot-and-mouth disease.

PAIT, C. F., & PEARSON, H. E. (1949.) **Rabies vaccine encephalomyelitis in relation to the incidence of animal rabies in Los Angeles.**—*Amer. J. publ. Hlth.* 39. 875-877. [Authors' summary copied *verbatim*.] 2674

In Los Angeles City and County approximately 200 rabid dogs are detected annually. There is only one human case per year but at least 800 persons are given rabies vaccine. The chance of acquiring rabies from known dog bites in Los Angeles is estimated to vary from 1:1,400 to 1:2,100.

There were 9 cases, one fatal, of post-vaccinal encephalomyelitis among 5,500 treated persons, an incidence of 1:600.

An adequate rabies control program acceptable to the public and directed at the canine population is highly desirable.

FENNER, F. (1948.) **The epizootic behaviour of mousepox (infectious ectromelia of mice). II. The course of events in long-continued epidemics.**—*J. Hyg., Camb.* 46. 383-393. [Author's summary copied *verbatim*.] 2675

Two long-continued epidemics of mousepox were set up with different strains of the virus and maintained for 190 and 290 days respectively. Considerable differences were observed between the behaviour of the two strains of virus, the Moscow strain being much more virulent and more highly infective than the Hampstead strain.

The two strains of virus maintained their original characters through the experiments.

Life tables were constructed for both epidemics, specific and non-specific deaths being dealt with separately. They show that high and durable immunity follows recovery from infection.

Two mice which had recovered from infection were found to harbour small quantities of the virus in the lungs, and in one case in the spleen also,

suggesting that chronic latent carriers of the virus may occur.

I. FENNER, F. (1949.) Studies in mousepox (infectious ectromelia of mice). IV. Quantitative investigations on the spread of virus through the host in actively and passively immunized animals.—*Aust. J. exp. Biol. med. Sci.* 27. 1-18. 2676

II. FENNER, F., & FENNER, E. M. B. (1949.) Studies in mousepox (infectious ectromelia of mice). V. Closed epidemics in herds of normal and vaccinated mice.—*Ibid.* 19-30. 2677

III & IV. FENNER, F. (1949.) Studies in mousepox (infectious ectromelia of mice). VI. A comparison of the virulence and infectivity of three strains of ectromelia virus. VII. The effect of the age of the host upon the response to infection.—*Ibid.* 31-43 & 45-53. 2678

I. The pock counting technique for virus titration, and the haemagglutinin inhibition test as a measure of antibody production, were the methods used in assessing the spread of ectromelia virus in mice actively immunized with vaccinia or ectromelia, and in mice passively immunized with antivaccinia or antiectromelia serum. The test dose was inoculated into the foot pad.

It was found that previous infection with ectromelia conferred almost complete immunity to reinfection. This immunity gradually subsided, but even one year later multiplication of the virus occurred only at the site of inoculation—it was rarely found in the spleen.

Passive immunization with serum allowed multiplication at the site of inoculation, limited multiplication in internal organs and reduced the clinical severity of the disease.

Previous infection with vaccinia virus was much less effective than previous infection with ectromelia. Virus reached the internal organs of most animals, though multiplication in the spleen was limited. Passive immunization with antivaccinia serum had no apparent effect on the course of the disease.

II. The effect of vaccination by the intranasal inoculation of vaccinia virus, in various doses, on the rate of spread of mousepox, and the resulting morbidity and mortality of the disease was investigated.

Mice were inoculated with vaccinia, tested for antihaemagglutinin titre 14 days later, and three days later mice infected with ectromelia were added to the herd.

If the dose of vaccinia virus was sufficient to produce a reasonable antihaemagglutinin titre, mice were not killed by exposure to ectromelia. When infection occurred, the clinical symptoms were mild and sometimes inapparent, an altered serological picture being the only sign.

Mice yielding no antihaemagglutinin response were as susceptible as normal animals.

III. Three strains of ectromelia virus, Moscow (mouse), Hampstead (mouse) and Hampstead (egg)—the latter having been passaged 50-60 times in egg—were tested for virulence and infectivity. The virulence of the two mouse strains was comparable, that of the egg strain much lower.

It is suggested that this may be due to slower multiplication of the virus giving the host time to produce antibodies, for virulence was much higher when inoculated intraperitoneally, thus coming into direct contact with the internal organs, than when inoculated into the foot pad.

It was found from closed epidemic experiments that the Moscow strain was the more highly infective.

IV. It was found that mice eight weeks of age withstood infection with ectromelia better than unweaned mice or mice one year old. This was the case whether the infection was spread naturally or given by foot pad inoculation.

In unweaned mice multiplication of virus proceeds rapidly; there is a very short interval between infection and invasion of internal organs. It is suggested that the shorter time available for antibody production and perhaps the less efficient antibody mechanism in the very young may be responsible for the high mortality.

The explanation of the greater susceptibility of older mice is not clear but may be due to deficient antibody production.—N. WICKHAM.

DICKINSON, L. (1948.) The serological relationship between vaccinia and ectromelia viruses.—*J. Hyg., Camb.* 46. 378-382. [Author's summary copied *verbatim*.] 2679

Elementary body suspensions of vaccinia and ectromelia were obtained from rabbit skin and chick embryo or mouse liver and chick embryo respectively and used to immunize rabbits.

Judged by the complement fixation and haemagglutination tests, the viruses from different hosts were very similar antigenically. Ectromelia and vaccinia appeared closely related, the heterologous virus titres being usually lower than the homologous.

Elementary body suspension agglutination tests did not reveal a similar relationship between the two viruses, but were not satisfactory on account of the low antibody content of the antiectromelia sera.

Highly active ectromelia antisera were not obtained and there was no evidence of multiplication of this virus in rabbits.

Only slight neutralizing activity was demonstrated in the antisera.

Elementary body suspensions of ectromelia

virus prepared from mouse livers, as well as the crude liver extracts, were soon inactivated. Egg membrane preparations were relatively stable.

CHU, C. M., DAWSON, I. M., & ELFORD, W. J. (1949.) **Filamentous forms associated with newly isolated influenza virus.**—*Lancet*. 256. 602–603. 2680

Electron micrographs are shown of recently isolated influenza A virus adsorbed on laked fowl erythrocytes from allantoic and amniotic fluid of infected fertile eggs; long filamentous forms, rods of intermediate length, and round or slightly ovoid elementary bodies are seen. Similar photographs were obtained from 12 virus isolations. The number of elongated forms was often comparable with the number of round or ovoid elementary bodies, while in a similar preparation of influenza A (PR 8) only a few elongated forms were demonstrable.

The following observations, which need confirmation by more extensive studies, suggest that the filamentous forms represent a stage in virus multiplication: these structures could be seen by dark-ground microscopy in infected allantoic fluid, but were not seen by dark-ground or electron microscopy in normal fluid; virus, passed through the tightest gradocol membranes likely to pass influenza virus, gave rise to both long and round forms when inoculated into eggs; the filaments and round elementary bodies could be eluted from the red-cell membrane; the long forms were agglutinated in large clusters by homologous antiserum.

Strains of virus A isolated in the recent epidemic are antigenically alike, and closely related to, but not identical with strains isolated in Europe and the U.S.A. in 1947; they are rather remotely related to the classical PR 8 strain.

—E. COTCHIN.

CAMINOPETROS, J. P. (1948.) La "Q" fever en Grèce le lait source de l'infection pour l'homme et les animaux. ["Q" fever in Greece. Milk of sheep and goats as the source of infection in man.]—*Ann. Parasit. hum. comp.* 23. 107–118. 2681

Intrapulmonary or intranasal injection of infected blood from human patients to goats and sheep causes an attack of Q fever after an incubation period of 6–10 days. There is a febrile reaction lasting 7–12 days and symptoms of broncho-pneumonia with a dry cough and dyspnoea. Subcutaneous injection leads to a temperature reaction, rigors and a local inflammatory reaction. Conjunctival instillation produces ophthalmia. In one kid that died after subcutaneous inoculation, the spleen was found to be greatly enlarged and the thickened pericardium,

covered with fine granulations, contained much fluid. Masses of intra- and extra-cellular *Rickettsia* were found in spleen smears.

During the reaction nasal discharge is infective on inoculation into g. pigs; but infectivity is lost soon after the temperature falls. As judged by inoculation tests the urine is consistently free from infection. The milk of goats becomes infective soon after the temperature rises and continues infective for at least three months.

It was found possible to infect a goat by exposure to contact with coughing goats and the milk of this animal remained infective until the end of its lactation. Goats' milk will retain its infectivity in the refrigerator for at least three months, but development of lactic acid soon destroys the "virus".

The milk of four out of 16 goats in a flock on the outskirts of Athens was found to be infective on inoculation into g. pigs. Infected milk was also found in two other flocks. In one of these flocks three ewes, which developed broncho-pneumonia, were later found to be giving infected milk. In no case have lesions been found in the udders of goats or ewes giving infected milk.

Natural infection of lambs and kids, 8–10 days after birth, occurred following ingestion of milk from dams which became infected prior to, or during, gestation. "Virus" may therefore persist dormant in the non-lactating udder of a pregnant animal; the young are born fully susceptible.

These observations throw light on several points, hitherto obscure, in the epidemiology of Q fever in man. Epidemics among soldiers in Greece, during and after the war, occurred in winter and spring when ticks were inactive. (They ceased abruptly when ticks appeared with the warmer weather.) Although it was known that infection in man occurred through contact with coughing cases, no explanation of the primary cases had hitherto been available. The infectivity of goats' milk suggests their origin.

From the point of view of control, the fact that infection can spread among goats *via* the respiratory tract and that the "virus" can persist for long periods in the udder is important.

Horses and mules infected by instillation into the conjunctival sac develop conjunctivitis and fever and their blood becomes infective for g. pigs. Cats are not susceptible. Dogs are said to give a febrile reaction; but "virus" cannot be recovered from their blood during the reaction.

—J. RICHARD HUDSON.

DYER, R. E. (1949.) **Q fever. History and present status.**—*Amer. J. publ. Hlth.* 39. 471–477. [Author's summary copied *verbatim*.] 2682

In Q fever we have a disease with known

potential sources of infection in infected cows, sheep, goats, the milk of these animals, wild animals, and a wide variety of ticks. Epidemiologic studies of the occurrence of Q fever in abattoir workers, laboratory workers, dairy workers, and residents of dairy areas indicate that an important method of transfer of the infection to man is through the medium of contaminated air, whether this be by droplet infection or by dust.

BELL, E. J., PARKER, R. R., & STOENNER, H. G. (1949.) **Q fever. Experimental Q fever in cattle.**—*Amer. J. publ. Hlth.* 39. 478-484. [Authors' summary slightly amended.] 2683

Q fever infection in lactating cows has been produced consistently by inoculation of *Rickettsia burneti* via the lactiferous duct. Rickettsiae were found in the milk of these cows for long periods of time, in some cases for over 200 days after inoculation. Exposure of the mammary gland to massive doses of a yolk-sac culture of *R. burneti* excited an acute mastitis accompanied by a marked systemic reaction. These symptoms appeared to be of brief duration, and recovery was spontaneous, yet rickettsiae continued to be shed in the milk. In animals showing these symptoms, rickettsiae were recovered from the blood during the acute period, and from numerous other tissues obtained from cows sacrificed at various intervals up to 63 days after inoculation.

Q fever rickettsiae were recovered from the faeces of calves feeding on infected milk. However, infection by this method was not definitely proved.

Experiments involving attempts to infect cattle by other routes of inoculation and by infestation with infected ticks (*Otobius megnini*) are described.

IRONS, J. V., MURPHY, J. N., Jr., RICH, A. B., & HILL, A. E. (1949.) **Q fever. Q fever survey in southwest Texas.**—*Amer. J. publ. Hlth.* 39. 485-491. [Authors' summary slightly amended.] 2684

Six cases of Q fever which occurred among butchers in two slaughter-houses at San Antonio, Tex., in November-December, 1947, were found as a result of a survey.

Approximately 5 per cent of slaughter-house workers' sera at San Antonio, Tex., showed complement-fixing antibodies for Q fever. Approximately 1.6 per cent of food handlers' sera at San Antonio showed complement-fixing antibodies.

Six cases of Q fever were found in widely scattered communities in south-west Texas.

R. burneti was identified in raw milk samples from two dairies in south-west Texas, but the significance of this finding was not determined.

Complement-fixing antibodies were found in sera from sheep and goats on a ranch where a case of Q fever occurred.

STRAUSS, E., & SULKIN, S. E. (1949.) **Q fever. Complement-fixing antibodies with *C. burnetii* antigens in various geographic areas and occupational groups in the United States.**—*Amer. J. publ. Hlth.* 39. 492-503. [Authors' summary copied verbatim.] 2685

Complement-fixation tests were performed in 5,470 sera using yolk-sac antigen of *R. burneti* (American Nine Mile strain). The sera were obtained from persons residing in Massachusetts, Minnesota, Oregon, and Texas. Sera were obtained from meat packers in Fort Worth, Tex., and Austin, Minn., and from dairy workers in the Dallas area.

Sporadic instances of complement-fixation, which may indicate Q fever, were found in sera from all geographic areas included in the study, suggesting that Q fever may occur in low incidence throughout the country. Evidence for its occurrence in appreciable numbers among packing-house workers in Fort Worth was presented. The evidence also suggested that residents of the southwestern part of the United States may have a higher incidence of complement-fixing antibodies with *R. burneti* than in other areas of the country.

GOERTTLER, V., & VÖHRINGER, K. (1948.) Die Behandlung der Bornaschen Krankheit der Pferde mit Sulfonamiden. [Treatment of Borna disease (equine encephalomyelitis) with sulphonamides.]—*Mh. Vet.-Med.* 3. 166-168. 2686

Treatment of 200 horses with sulphonamides lowered the mortality from 90 to 45%—with globucid [sulphanilamido ethyl thiodiazole] and eubasin [sulphapyridine] to 35%. The drugs must be given *per os* early, up to the fourth day of illness, as pills or with the food or drinking water, etc. The following dosage of eubasin is recommended: first day, 9 tablets, 45 g.; second to fourth day, 6 tablets each, 90 g.; fifth day, 3 tablets, 15 g.; the total dosage being 150 g. administered as two to three doses *per diem*. After completion of treatment at least four weeks' rest is necessary.—W. R. BETT.

LOWE, H. J., WILDE, J. K. H., LEE, R. P., & STUCHBERY, H. M. (1947.) **An outbreak of an aberrant type of rinderpest in Tanganyika Territory.**—*J. comp. Path.* 57. 175-183. 2687

An outbreak of mild rinderpest in a herd of Ankole-zebu cross-bred cattle near Tabora is described. The outbreak was confirmed by the isolation at the laboratory of a strain of virus from a lymph node of an affected calf. The strain was of low virulence for cattle when first isolated; but,

during eight passages, virulence appeared to become enhanced.

The condition was characterized by watery or muco-purulent discharge from the eyes, spreading irregular ulcers in the mouth and loss of condition. Although some cattle passed fairly fluid faeces, diarrhoea was not a feature.

The outbreak could not be traced to infection from cattle and the authors suggest that a virus adapted to game was responsible. The cattle involved in the original outbreak were of a highly susceptible type, and more resistant zebu cattle might have escaped infection from the same source. Three further outbreaks occurred within a circle of ten miles. In one of these the disease was also very mild; in the other two, no difficulty was experienced in making a clinical diagnosis of rinderpest.

[During the adaptation of rinderpest viruses to goats at the Kabete laboratory returns to cattle were made at frequent intervals. It was found that, as the viruses became attenuated, symptoms and lesions became less marked and disappeared first from the eyes and mouth, then from the abomasum, whilst enteritis tended to persist. It is interesting to note that mild strains exist which still produce marked lachrymation and stomatitis, but little enteritis.]—J. RICHARD HUDSON.

MUCH, H. (1949.) Beitrag zur Behandlung des böartigen Katarrhalfiebers. [Contribution to the therapy of bovine malignant catarrh.]—*Wien. tierärztl. Mschr.* 36. 177–183. 2688

The symptoms and therapy of bovine malignant catarrh are described.

Of 15 infected cows 13 recovered after treatment with thoromangan, an iodine-thorium-manganese solution, given intravenously. The first dose was 20 ml.; later doses varied individually. Higher doses proved harmful.

Other remedies, such as naganol, yatren vaccine and intravenous calcium-therapy were tried separately or in conjunction with thoromangan, but results were less successful.

The importance of early treatment is emphasized.—E. G.

I. EDWARD, D. G. ff. (1948.) Immunization against louping-ill. Vaccines prepared from chick embryos.—*Brit. j. exp. Path.* 29. 367–372. 2689

II. EDWARD, D. G. ff. (1948.) Immunization against louping-ill. Immunization of man.—*Ibid.* 372–378. 2690

III. EDWARD, D. G. ff. (1948.) Immunization against louping-ill. Immunization of cattle.—*Ibid.* 600–607. 2691

I. Formalized vaccines prepared from chick embryo cultures protected sheep from louping ill.

They were unstable, being inert after 17 weeks' storage. Attempts to stabilize the vaccines were unsuccessful.

II. A high proportion of workers in laboratories which produce louping ill vaccine become infected with the virus, and close contact with the work is not essential for production of infection. Human volunteers vaccinated with chick embryo vaccines yielded no antibody response, but three doses of formalized mouse brain vaccine produced high titres in three human subjects. The mouse brain vaccine produced severe local reactions.

III. Using a total of 14 young cattle, louping ill vaccine prepared from mice and sheep was tested in single and double doses. At intervals of 20–46 days after vaccination, a standard dose (shown by mouse inoculation to contain between 10^5 and 10^7 M.L.D. of virus) of infected sheep brain was injected subcutaneously and, three days later, the brain was traumatized by intracerebral injection of 4 ml. of a 2% suspension of starch in saline. It was impossible to decide whether either of the vaccines gave protection which would be likely to be effective in the field.—G. B. S. HEATH.

BEAMER, P. D., BLOCH, E. H., WARNER, L., BROOKS, F., ANLIKER, J. A., & KNISELY, M. H. (1949.) Sludged blood in three young pigs experimentally infected with hog cholera.—*Amer. j. vet. Res.* 10. 111–114. 2692

Observations of a preliminary nature are recorded. The circulating blood was observed microscopically in the small vessels of the obliquely-illuminated bulbar conjunctiva of three Duroc-Jersey pigs weighing about 25 lb. each. The day before experimental infection, the circulating blood and vessels were normal: the red cells were not agglutinated, and tended to repel each other; leucocytes were not sticking to the healthy uninjured endothelium; the blood-flow was streamlined; there was no detectable haemoconcentration or oedema, and the blood-flow in most vessels of 60μ – 120μ diameter was so rapid that the individual red cells could not be distinguished. A pigmentation of the bulbar conjunctiva was seen as sharply stippled areas between vessels, the latter having a wide, bright unpigmented band on each side, serving to mark clearly their anatomical position.

The pigs were injected subcutaneously with 2.0 ml. of commercially-prepared swine fever virus, and further observations were made seven and eight days later. Then all, or nearly all, the red blood cells were agglutinated to form small, rather soft "basic masses" of approximately equal size, giving a fairly homogeneous sludge; these basic masses did not bulge the terminal arterioles as they passed through. In a few small

venules, "charge agglutination" was observed in these basic masses, forming larger aggregates which broke up again quite easily. Over large areas of the bulbar conjunctiva, most of the vessels had so contracted that they neither contained nor conducted blood, their site being marked by unpigmented stripes. In most of the bulbar conjunctiva also there was visible oedema, and progressive haemoconcentration could be observed in postcapillary small venules.—E. COTCHIN.

SLAGSVOLD, L. (1946.) Smittsom hostesyke og nysesyke hos gris. [**Infectious influenza and infectious rhinitis in pigs.**].—*Norsk VetTidsskr.* 58. 445-450. 2693

In September, 1946, the pig diseases, influenza in piglets and infectious rhinitis, were scheduled under the Norwegian Law of July 14th, 1894, on livestock diseases and their control. In this article the Veterinary Director describes them so as to make their recognition and differentiation easy for veterinary surgeons. There is circumstantial evidence that both diseases may have a common origin, and in this connexion the postulation of a "virus" common to both diseases is advanced.

In the same issue of *Norsk VetTidsskr.* on page 483 appears a copy of the law as applied to these diseases: control is largely by segregation of affected herds.—J. E.

BASSET, J. (1948.) Maladie du chien. Vaccination et traitement par le Virus-Furet. [**Canine distemper. Immunization and treatment of distemper with ferret-adapted virus.**].—*Bull. Acad. vét. Fr.* 21. 318-322. 2694

B. is concerned with explaining and suggesting the causes for the limited success obtained in practice by French veterinarians with the Green method of distemper immunization. He suggests that the poor results obtained could have been foreseen and quotes evidence in respect of other diseases where similar methods have been employed, *i.e.*, vaccination with a "modified" virus. The French vaccine is evidently identical in type with Green's vaccine and is prepared from original American stock (ferret-adapted). The only other distemper vaccine available in France is one prepared from virulent virus adsorbed on aluminium hydroxide (aluvirus). In practice using either of these two methods it is found that in a percentage of cases distemper later develops in spite of inoculation, whilst on occasion the disease itself results immediately following vaccination. [The percentage is evidently much higher than that experienced in Great Britain with the use of the Laidlaw & Dunkin method.] This state of affairs has led to the question being asked whether it is honest to advise distemper vaccination to clients

when only such preparations are available. B. elaborates in detail his theory that so-called modification of virus by ferret-adaptation is not a modification proper and that the virus retains its full virulence in spite of its numerous passages and apparent low pathogenicity and that the severity of reaction is wholly dependent on the antibody response of the individual. Thus, when a susceptible individual is vaccinated, the virus will display its virulence and distemper will result. In this connexion B. suggests that the Laidlaw-Dunkin method is theoretically the ideal, inasmuch as the natural resistance is artificially heightened prior to inoculation and fully pathogenic virus can then be used to produce full immunity. He is also evidently at variance with Green's theory of "interference" in respect of the action of French (Green) vaccine when used as a treatment. The results obtained in practice in this respect seem to be even worse than those where the vaccine is used prophylactically and at best only a transient improvement is noted. In a short discussion which follows several speakers support the results in practice already mentioned by B.

—A. H. HOGG.

ANON. (1949.) Distemper and hard pad disease in dogs. Central Veterinary Society discussion.—*Vet. Rec.* 61. 175-178. 2695

A large amount of clinical evidence, conflicting and otherwise, becomes available from the above discussion as to the connexion existing, if any, between hard pad disease and distemper. A large number of speakers took part and a variety of viewpoints emerged. One speaker had seen several cases of hard pad disease in dogs vaccinated against distemper by the vaccine-virus method and that by early use of anti-distemper serum recovery was possible. Some evidence was also brought forward to support the view that hard pad disease has been in existence for years and previously confused with, or diagnosed as distemper. Evidence was also suggested that hardening of the pads is not a necessary symptom of the disease, *i.e.*, it may be present without any hardening taking place. Several speakers mentioned tonsillitis as a prominent commencing symptom of hard pad disease. Another point at issue was whether a dog vaccinated by the vaccine-virus method is immune to hard pad disease; and further is this immunity dependent on there being a visible reaction in the dog to the virus inoculation. A detailed discussion arose on the possibility of an alteration in the character of the virus of true distemper so that affinity for certain body systems becomes modified; it was suggested that perhaps an altered form of distemper virus was now at work. The question of the efficacy of the normal distemper inoculation against such an

altered form was raised several times. Methods of production of sera and vaccines against virus diseases in general, and especially canine distemper, were discussed. The need was stressed for constant vigilance in keeping these products up to date, *i.e.*, active against possible changes in the method of attack or altering forms of the virus they were intended to control.—A. H. HOGG.

KENNEDY, A. H. (1949.) **Studies on neurotropic distemper of foxes. VIII. Deviations in the blood of foxes showing no symptoms of neurotropic distemper during an epizootic.**—*Canad. J. comp. Med.* **13.** 49–53. [For previous parts, see *V. B.* **19.** 153.] 2696

K. examined blood from foxes, clinically well but exposed to foxes with symptoms of neurotropic distemper. The findings resembled those in obviously infected animals. Lymphopenia was the principal change, although there was an increase in the percentage of haemoglobin above the normal range. K. suggests that blood examination may be the only means of detecting effects of neurotropic distemper in some foxes.

—P. J. G. PLUMMER.

BYERLY, T. C. (1948.) **Report of the committee on incidence of Newcastle disease.**—*J. Amer. vet. med. Ass.* **112.** 125–126. 2697

This report summarizes the results of a survey on the incidence of Newcastle disease in the Middle Atlantic region of the U.S.A. Eighty-three farms were surveyed. Blood samples were withdrawn from chickens on 49 farms; of these 22 yielded positive and 27 negative reactions. Of the 22 positive samples, 16 were clinically diagnosed and only one positive clinical diagnosis was not verified in the laboratory. Six cases that proved positive on laboratory diagnosis were not diagnosed clinically.

The incidence of Newcastle disease in the Eastern Shore region is 30%.

The mortality in flocks affected with Newcastle disease is about twice as high, at 20%, as in non-affected flocks. The loss caused by the longer feeding period before birds reached a marketable size could not be accurately estimated. Reports indicated that it required about two weeks longer to finish birds in affected flocks.

Data supplied by pathologists in 21 states were also analysed. Of 148 outbreaks in young chickens 39 (26%) were in purchased chicks.

—F. D. ASPLIN.

MANTOVANI, G. (1948.) **Contributo allo studio dei caratteri biologici dell'infravirus agente della infezione simil-pestosa dei polli in Italia. [Biological properties of fowl plague virus in Italy.]**—*G. Batt. Immun.* **38.** 247–260. [English, French and German summaries.] 2698

The distribution of the virus in the blood, spleen and central nervous system and its pathogenicity for pigeons was studied. The brain is the tissue richest in virus. [The pathogenicity for pigeons suggests that the virus studied was that of Newcastle disease.]—M. C.

FREYMANN, M. W., & BANG, F. B. (1949.) **Human conjunctivitis due to Newcastle virus in the U.S.A.**—*Johns Hopk. Hosp. Bull.* **84.** 409–413. [Authors' summary copied *verbatim.*] 2699

The virus of Newcastle disease in chickens in the United States is capable of causing conjunctivitis in man, as demonstrated by the accidental infection of three laboratory workers. Virus was isolated from 2 of the cases.

Serologic studies indicate that antibody response is slight in these cases, and that laboratory diagnosis in these superficial infections should rest on isolation of the virus.

HOWITT, B. F., BISHOP, L. K., & KISSLING, R. E. (1948.) **Presence of neutralizing antibodies of Newcastle disease virus in human sera.**—*Amer. J. publ. Hlth.* **38.** 1263–1272. 2700

Neutralizing antibodies for Newcastle disease virus were demonstrated in the sera of children and adults, in Tennessee and Alabama, suffering from a mild central nervous infection. Laboratory personnel who had previously yielded negative reactions for Newcastle disease virus antibody developed an influenza-like infection and neutralizing substances for Newcastle disease virus after they had been working with it. Virus was not isolated from any human cases. The authors suggest that Newcastle disease virus may be responsible for many of the atypical central nervous system infections that have been reported in man.—F. D. ASPLIN.

DAWSON, I. M., & ELFORD, W. J. (1949.) **Electron microscope studies on the interaction of certain viruses with fowl red cell membranes. [Correspondence.]**—*Nature, Lond.* **163.** 63–64. 2701

Suspensions of cell "ghosts" were prepared by lysis of fowl red cells with saponin. These cell "ghosts" were mixed with virus preparations under appropriate conditions for absorption to take place, then washed and fixed with osmic acid, mounted on a collodion film and shadowed with palladium for examination in the electron microscope.

Impressive photographs of absorbed virus bodies were obtained. There was general random distribution of virus bodies with no evident set pattern. Counts of numbers of particles per given area of membrane paralleled the concentrations of virus determined on the fluids by other methods.

—F. D. ASPLIN.

DALLDORF, G., SICKLES, G. M., PLAGER, H., & GIFFORD, R. (1949.) A virus recovered from the feces of "poliomyelitis" patients pathogenic for suckling mice.—*J. exp. Med.* 89. 567-582. [Authors' summary copied *verbatim*.] 2702

A virus has been recovered from the feces of two children having symptoms similar to those of poliomyelitis. The virus is pathogenic for suckling mice and hamsters but not for *rhesus* monkeys. It induces striking lesions in the skeletal muscles of the experimental animal but not in the central nervous system. Other viruses inducing similar signs and lesions in suckling mice have been isolated from several other outbreaks of a poliomyelitis-like disease, including one large urban epidemic.

RHODES, A. J. (1947.) Acute anterior poliomyelitis. A survey of present knowledge, with particular reference to the method of spread.—*Bull. Hyg., Lond.* 22. 377-378. [Part copied *verbatim*.] 2703

It is natural to enquire whether there is any evidence that poliomyelitis may be contracted from non-human sources. Lumsden (1942), for example, blamed hosts such as rats, birds, fowls, and bovines, with fleas, flies and mosquitoes as vectors.

There is no evidence that rats, chickens, pigeons or larger farm animals harbour poliomyelitis virus, or that ants or cockroaches are infected (Toomey, Takacs and Tischer, 1943; Gordon, 1945; Pearson and Rendtorff, 1945; Pearson *et al.*, 1945). Although others have found no evidence that dogs may be infected with virus, Gordon (1945) reports that the sera of 3/37 animals neutralized the Lansing strain.

A certain amount of suspicion has been thrown on pigs, who may suffer from a paralytic infection known as Teschen disease. However, the balance of opinion suggests that the disease is unrelated to human poliomyelitis (Frauchiger and Messerl, 1939; Frauchiger and Hofmann, 1941).

There has been some suggestion that paralytic conditions of chickens may be transmissible to man. Thus Preioni (1941) observed cases of poliomyelitis on an isolated farm, where there had been no contact with the outside world for several months. He suggested that the infection derived from paralysed chickens and turkeys; the causal agent may have been transmitted by the chicken louse.

The only extra-human source to be seriously considered is rodents, for a number of viruses similar to poliomyelitis, especially Theiler's virus, infect these animals under natural conditions. Some human poliomyelitis strains also infect rodents. It is evident, therefore, that human poliomyelitis is not a unique agent affecting man

only, but is closely related to agents producing disease in rodents. It has been suggested that human poliomyelitis virus is probably ultimately derived from rodents (Burnet, 1945b).

Jungeblut and Dalldorf (1943) isolated a rodent-pathogenic virus (MM) from the brain of a house mouse found dead in the home of a fatal case of human poliomyelitis; a somewhat similar virus was found in the brain stem of the human case. Later (1946) they isolated two strains falling into the murine poliomyelitis group from a number of house mice trapped in the New York area. These strains were not identical, but were closely related.

At this stage, it does not appear likely that rodents, or other extra-human agencies mentioned above, need be seriously considered as sources of infection in poliomyelitis.

ADAMSON, J. D., & McFARLANE, R. H. (1947.) Virus epidemic.—*Manitoba med. Rev.* 27. 570-573. [Copied *verbatim* from abst. in *Bull. Hyg., Lond.* 23. 160. (1948). Signed: A. J. RHODES.] 2704

The authors claim that in an epidemic of febrile illness in Manitoba in the summer of 1947, in addition to infections due to poliomyelitis and Western equine encephalomyelitis viruses, there was evidence for the presence of a third infective agent. Hundreds of cases occurred in the Province, and the present authors made a detailed study of 20 cases seen in hospital.

The onset was rather abrupt. Headache was the presenting symptom in nearly every case. It was usually frontal, but occasionally was not localized. Muscle pain or stiffness was present at onset in nearly all cases. It was usually localized to the neck and dorsal spine, occasionally to the limbs or lumbar region. About a quarter of the cases had dizziness. Fever was not over 100.5°F., and lasted for only a short time. Apathy and listlessness were very common. These manifestations lasted for a few days to two weeks. About half the patients were incapacitated for a few days, the rest continued at work.

The most characteristic feature of the illness was the return of symptoms, shown by 15 of those studied closely. The time of recurrence varied from the 5th to the 18th day after the original attack. The second attack was more violent than the first. The headache was worse, and nausea and vomiting more common and more severe. The temperature was higher (up to 103°F.). Somnolence and listlessness were more marked. Usually the second attack lasted only a day or two, leaving weakness, muscle soreness, and stiff spinal muscles for about a week. Three patients had a tertiary but milder attack several days after the second.

All patients recovered without paralysis or other disability. One patient had herpes [? zoster] on the face, eyelids, and forehead, and one had bilateral orchitis [? mumps], in both instances in the secondary attack.

The authors believe this disease to have been due to a virus, but not to the virus of influenza or Western equine encephalitis.

Differentiation from abortive poliomyelitis was not clearly made.

MORTON, R. S. (1948.) **Syringe-transmitted jaundice. An inquiry and a plea.**—*Brit. med. j.* Nov. 27th. 938–939. 2705

Investigation at a Venereal Diseases Clinic showed that transmission of hepatitis and jaundice resulted through faulty sterilization routine. Despite the availability of a number of sterile syringes, lack of proper supervision resulted in the use of a syringe on more than one patient.

—G. V. LAUGIER.

ROUNTREE, P. M. (1949.) **The serological differentiation of staphylococcal bacteriophages.**—*J. gen. Microbiol.* 3. 164–173. [Author's summary copied *verbatim*.] 2706

By the use of anti-bacteriophage sera prepared in rabbits, thirty-nine staphylococcal phages were divided into six serological groups. The first group (A) comprised phages lysing coagulase-positive staphylococci of human origin. They were stable at 20° but inactivated at 49°. They multiplied in broth cultures containing sufficient tryptophan but rarely produced clearing of such cultures. The second group (B) lysed both bovine and human coagulase-positive staphylococci. They were markedly sensitive to heat and required growth factors present in the vitamin B complex. Group C comprised phages of ovine origin which were antigenically related to group B phages and also resembled them in their growth requirements. Group D comprised phage K, which lysed both coagulase-positive and negative staphylococci and was antigenically related only to phage W. Phage W belonged to group E and lysed only some coagulase-negative staphylococci. Group F was related in its general characters with the phages of group A.

A staphylococcus was found carrying two serologically distinct phages, one of which was detected during the process of adaptation of a phage filtrate to a new propagating strain.

Since many strains of staphylococci are lyso-genic, lytic filtrates may contain contaminating phages which manifest themselves during adaptation. Adequate serological characterization of the phages used for typing and for investigations of phage-bacterium relationships and of apparent mutation is therefore necessary.

COHEN, S. S. (1949.) **Growth requirements of bacterial viruses.**—*Bact. Rev.* 13. 1–24. [Author's conclusions copied *verbatim*.] 2707

In the foregoing, data have been presented on phage multiplication as affected by numerous environmental factors. It has been shown that these environmental factors vary in their complexity, from the ammonium salts which can supply the nitrogen for T2 growth in *E. coli*, to the organized enzymes of *E. coli* which effect synthesis essential to the production of T2. Methods have been devised and described to ascertain more precisely the role of these growth requirements at one or several stages of virus growth. It has been shown, for instance, that tryptophan is a virus constituent and must be provided in the environment to permit the synthesis of virus constituents. This has been demonstrated in tryptophan-requiring bacteria, or by one of the four methods, i.e., the supplement, depletion, antimetabolite or direct utilization techniques in cells capable of synthesizing tryptophan. The interpretation of the results has depended on a great deal of knowledge concerning the growth of a particular bacterial virus and general biochemical information concerning the possible metabolic rôle of chemical compounds. We are at the point where a detailed determination of growth requirements and analysis of their mode of action can be made; with a very few exceptions, such a study has not yet been made. The pertinence of these data and the phage methods to problems of the growth and control of other viruses is so clear as to make one wonder if attempts at their application to these other systems should not be more widespread.

NEITZ, W. O., ALEXANDER, R. A., & ADELAAR, T. F. (1947.) **Studies on immunity in heart-water.**—*Onderstepoort J. vet. Sci.* 21. 243–252. 2708

The authors record further experiments confirming and extending the results described by NEITZ in 1939 [*V. B.* 11. 679]. The experiments were made in sheep maintained free from infection from the time of the first exposure until injected with a test dose of infected blood.

Although "virus" usually disappears from the blood after the febrile reaction, it may persist for as long as 60 days. It is probably correct to say, therefore, that an attack is followed by a period of premunition. Thereafter there appears to be solid, sterile immunity lasting, in most instances, for at least 12 months. Immunity then begins to wane; but, under laboratory conditions, is sufficient to protect against death for four years, the limit of the experiment.

When immune sheep are inoculated with "virus" their blood becomes infective during the

time that a temperature reaction would occur in a susceptible sheep. It is clear, therefore, that immune sheep may be responsible for the maintenance of infection on farms.—J. R. HUDSON.

ANDREWES, C. H., KING, H., & WALKER, J. (1946.) **Experimental chemotherapy of typhus. Antirickettsial action of p-sulphonamidobenzamidine and related compounds.**—*Proc. roy. Soc. Ser. B.* 133. 20–62. [Authors' summary copied *verbatim*.] 2709

The discovery of the pronounced antirickettsial activity of p-sulphonamidobenzamidine on experimental typhus infections in mice has led to a search for compounds of enhanced therapeutic action. A large number of compounds have been prepared in development of the sulphonamido-amidine structure, but anti-rickettsial activity has been found to be confined to about a dozen substances intimately related to p-sulphonamidobenzamidine, only one, namely, p-sulphonamidobenzamidine, having a very slightly superior therapeutic action.

The significance of the discovery of yet another sulphonamide type with pronounced biological activity is discussed.

BERGE, T. O. (1948.) **Employment of soluble antigen in screening tests for typhus complement fixation.**—*Publ. Hlth Rep., Wash.* 63. 529–537. 2710

The process of purification of rickettsial suspensions from infected yolk sacs by ethyl-ether extraction, releases a soluble antigen, derived from the capsular substance, into the aqueous fraction. Such soluble antigens from epidemic or murine strains react by complement fixation with heterologous and homologous immune sera. The immune serum gives a higher titre with the homologous soluble antigen than with the heterologous or with heated antigens. Absorption of the immune serum with heterologous antigen, or heated antigen of either kind, removes a common antibody, responsible for cross reactions, leaving only an antibody which reacts with the unheated homologous antigen.

Since the preparation of specific rickettsial antigens is exacting and expensive, it is of interest to determine the value of the soluble antigens, which are an inexpensive and abundant by-product.

To determine the value of the soluble antigens as a screening test for typhus, g. pig immune sera against Epidemic Breinl and Murine Wilmington strains were tested by complement fixation against soluble antigens from four strains, and specific antigens from four strains. Both the antigens and the sera were titrated in increasing dilutions. The soluble antigens were as sensitive as the specific antigens, and in some cases more sensitive.

Complement fixation tests with these antigens were also undertaken on 475 presumably normal sera. One hundred and sixty-nine gave positive results with the soluble antigen and 72 of these were also positive with one or more of the specific antigens. In no instance was a positive reaction obtained with specific antigen where the reaction with the soluble antigen was negative. With the exception of six sera, the titre with the soluble antigen was as high, or usually higher, than with the specific antigen. Of the 97 specimens which were positive with the soluble antigen but negative with the specific antigen, 71 were tested by Kolmer's complement-fixation technique for syphilis; only three were positive, so the non-specific rickettsial reactions are not generally attributable to syphilitic infection.—G. FULTON ROBERTS.

Fox, J. P. (1949.) **The antibody response of rabbits to rickettsial vaccines in water-in-oil emulsion.**—*Amer. J. Hyg.* 49. 303–312. [Author's summary copied *verbatim*.] 2711

The development of complement-fixing antibodies against epidemic and murine typhus and Rocky Mountain spotted fever and of mouse-toxin neutralizing antibodies against both types of typhus in the sera of rabbits inoculated with yolk-sac vaccines incorporated in a water-in-oil emulsion has been observed to exceed greatly, with respect to both maximum titer and persistence, that resulting from single or repeated inoculations with vaccine in the aqueous phase.

A similar phenomenon was not elicited in eastern cotton rats inoculated with epidemic typhus vaccine.

The antibodies present at the intervals of peak response to emulsion type epidemic or murine typhus vaccine were found to exhibit only moderate cross reactions with typhus antigen of the heterologous but immunologically related variety.

Vaccines prepared from yolk sacs infected with the Karp strain of *Rickettsia orientalis* and similarly incorporated in an emulsion promoted only a moderate resistance to challenge infection on the part of guinea pigs and no consistent resistance on the part of mice or cotton rats.

RIS, H., & Fox, J. P. (1949.) **The cytology of rickettsiae.**—*J. exp. Med.* 89. 681–686. [Authors' summary copied *verbatim*.] 2712

Internal structures of rickettsiae seen with phase contrast microscopy and in the electron microscope contain desoxyribonucleic acid and are therefore nuclear structures similar to those found in bacteria. They are minute spherical bodies, either single as in spherical rickettsiae or varying in number from 2 to 4 in rod-shaped forms. Occasional dumbbell-shaped chromatinic bodies are thought to represent these structures in the process of division. The presence of ribonucleic

acid in the cytoplasm of rickettsiae was demonstrated with the use of ribonuclease and basic dyes. Rickettsiae therefore have a cellular organization

See also absts. 2770 (bovine malignant catarrh); 2832-2835 (annual reports).

similar to that of certain bacteria, with a clear differentiation into nuclear structure and cytoplasm.

IMMUNITY

SAINT-MARTIN, A. (1948.) L'ictère hémolytique des muletons. [**Haemolytic jaundice (Icterus neonatorum) in young mules.**]—*Rev. Méd. vét., Lyon et Toulouse*. 99. 114-125. 2713

The symptoms of icterus neonatorum in mules are described. The animals are always healthy at birth, but asthenia supervenes between two hours and three days (usually about 12 hours) subsequently. The sooner signs develop after birth, the worse is the prognosis. Respiration is quickened and the heart beat is accentuated. Haemoglobinuria is inconstant; submucous haemorrhages frequently accompany the jaundice. The erythrocyte sedimentation rate is raised, and there is profound anaemia. Death usually supervenes in 12-24 hours. A table sets out the symptoms of this disease in rats, mules and human beings, in comparison.

After reviewing, and dismissing the hypothesis that the disease may be due to infestation with *Babesia equi*, the author describes the work of CAROLI & BESSIS in demonstrating the iso-immunization of the mare against the foal, and the analogy with similar immunization against the rhesus factor in man. Attention is drawn to the presence of anaemia, spherocytosis and capillary dilatation in the new-born mule, but absence of neurological signs.

Serologically it is shown that antibodies against the red cells of affected mules are absent or barely detectable in unmated mares or dams of normal mule foals, but are present in high titre in the dams of affected mule foals. Injecting donkey's cells into the dam of an affected mule foal produced a far quicker and greater agglutinin response than in an unmated mare.

The presence of an incomplete or blocking antibody [which is similar in all respects to the red cell agglutinin except that it attaches itself to the cells without agglutinating them, in a saline medium,] can be demonstrated in three ways. First, a prozone of inhibition may be observed when titrating the agglutinin [both the agglutinin and incomplete antibody being present together, the former in higher titre]. Secondly, a blocking effect may be observed so that cells once treated with the incomplete antibody are no longer agglutinated by the agglutinin. Thirdly, the agglutinin titre in a serum medium may prove higher than in a saline medium [the incomplete antibody is present in higher titre than the

agglutinin in this case; the former will agglutinate in a serum medium].

Mention is also made of agglutinins in the mare's milk, and of a feeble auto-agglutinin in the mule's serum.

After discussing the difficulties of treatment by transfusion, the author recommends giving 8 litres of blood by the jugular vein, under pressure of 50-60 cm. of water, taking about two hours. The blood used was from either normal mule, horse or unmated mare, no advantage of any one of these being demonstrable over the others. In all cases a sharp reaction accompanied transfusion. Exsanguination-transfusion may prove preferable.

Of twelve cases treated by transfusion four recovered. The treatment of three cases, one dying, is given in detail. [See also *V. B.* 19. 410 & 411, absts. 1848-9.].—G. F. ROBERTS.

COOMBS, R. R. A., CROWHURST, R. C., DAY, F. T., HEARD, D. H., HINDE, I. T., HOOGSTATEN, J., & PARRY, H. B. (1948.) **Haemolytic disease of newborn foals due to iso-immunization of pregnancy.**—*J. Hyg., Camb.* 46. 403-418. [Authors' summary and conclusions copied *verbatim*.] 2714

Six cases of haemolytic disease in newborn foals apparently due to iso-immunization of pregnancy are described from their clinical, serological, haematological and pathological aspects. The findings agree closely with those seen in the same disease in newborn mules.

The disease may be diagnosed serologically by demonstrating the *in vivo* iso-sensitization of the foal's red cells by means of the direct anti-globulin-sensitization test. It is quite possible that after further investigation a modification of Diamond's albumin tube test may be also of value. Immune anti-red cell iso-antibodies of more than one specificity may be demonstrated in the dams' sera.

Despite the acute haemolytic process, very few reticulocytes and no erythroblasts are seen in the peripheral blood.

The morbid histology of the tissues of foals dying with the disease exhibits various points of interest which are discussed.

The clinical aspect is not described in this paper in any detail. However, a programme is suggested which would enable a successful exsanguino-transfusion of compatible blood to be

carried out at very short notice. At present this seems to be the logical and most practical method of specific treatment.

COULSON, E. J., & STEVENS, H. (1949.) **Quantitative studies in anaphylaxis. I. Influence of age and body-weight of guinea pigs on the sensitizing and shocking dose.**—*J. Immunol.* 61. 1-10. 2715

COULSON, E. J., STEVENS, H., & SHIMP, J. H. (1949.) **Quantitative studies in anaphylaxis. II. The relationship of the shocking dose to the sensitizing dose.**—*Ibid.* 11-15. 2716

I & II. The sensitizing dose of purified ovalbumin required to produce death when challenged three weeks later was constant for g. pigs, 2-20 weeks old and of varying weight. G. pigs 1-3 years old were more resistant and required a larger sensitizing dose. The shocking dose was constant for animals 2-7 weeks old, but was doubled for those 17 weeks old. There was no sex difference in sensitivity.

The shocking dose causing death may be smaller than the sensitizing one when small doses are involved, but otherwise the fatal shocking dose rises as the sensitizing dose increases.—K. G. T.

VOLK, V. K. (1948.) **Observations on the safety of multiple antigen preparations.**—*Amer. J. Hyg.* 47. 58-63. 2717

This report deals with the safety of simultaneous immunization of man with three, four or five antigens chosen from the following: diphtheria toxoid (liquid and alum-precipitated), whooping cough vaccine, tetanus toxoid (liquid and alum-precipitated), typhoid fever vaccine and scarlet fever toxin (regular, partially detoxified and tannic acid-precipitated). Each antigen was used in a strength approved by the (American) National Institute for Health. The work was done under guidance of a committee and all products were first proved to be non-toxic for animals. The multiple-antigen preparations were tested on a large group of adults before children were injected. About 1,500 adults and 750 children were treated.

Local reactions were classified as mild,

moderate or severe according to the tenderness and redness that developed in the arm and general reactions also as mild (temperature not exceeding 100°F.), moderate (100°-102°) and severe (over 102°). Observations were made daily for 11 days.

Unfortunately no controls were inoculated with the typhoid vaccine alone; but in view of the well known reactions to this vaccine, it is probable that the more marked reactions to the 5-antigen preparations, containing this vaccine, compared with the 3- or 4-antigen preparations, from which it was omitted, were due to the inclusion of this particular vaccine.

Children were found to give fewer local reactions than adults and from the standpoint of reactions the intramuscular route was found preferable to the subcutaneous. The number of local and general reactions was reduced by cutting the dose from 1.0-0.5 ml. The severity of the reactions increased with the number of repeat injections, strongly suggesting that reactions were related to sensitization. The relative frequency of local and general reactions should not discourage the use of multiple immunization procedures. A warning to the parents of the possibility of local and general reactions should save unnecessary alarm.

Further reports on the efficacy of these multiple preparations are promised.—J. R. H.

PATTISON, I. H. (1948.) **Immunological studies with group-B streptococci.**—*J. Path. Bact.* 60. 219-237. [Author's conclusions copied verbatim.] 2718

Mice and guinea-pigs can be immunised against an intraperitoneal test dose of group-B streptococci of human or bovine origin by a series of intraperitoneal inoculations with living or formalised whole cultures of the homologous strain; this immunity is frequently demonstrable up to at least two months after the last immunizing inoculation.

The method of mouse immunisation described may be used to examine immunological relationships among different strains of group-B streptococci.

See also absts. 2623-2626 (brucellosis); 2630-2632 (TB); 2653 (leptospirosis); 2664 (coccidiosis); 2679 (pox diseases); 2689-2691 (louping ill); 2694 (distemper); 2700 (Newcastle disease); 2708 (heartwater); 2710-2711 (ricketsial infections).

PARASITES IN RELATION TO DISEASE [GENERAL]

BIOCCA, E., AGOSTINUCCI, G., & BRONZINI, E. (1949.) **Ricerche parassitologiche preliminari sulle feci dei mammiferi del giardino zoologico di Roma. [Parasites among mammalia in the Zoological Gardens at Rome.]**—*Riv. Parassit.* 9. 169-175. [English summary. Abst. in *Trop. Dis. Bull.* 46. 179-180. (1949), copied verbatim. Signed: H. HAROLD SCOTT.] 2719

This is the first of a series of records of parasitological infections of animals in the Rome Zoological Gardens. The object of the examinations was twofold: to determine the general health of the animals as regards the presence of parasites and to discover whether any new parasites could be found. Altogether 244 animals' faeces were examined in the 3 months, February-

April 1948; these included 3 Families of Primates, the Pre-simian Lemurs, 7 Families of Carnivora, 9 of Ungulata, 3 of Rodentia, and 1 each of Pinnipedia, Edentata and Marsupialia. The Cercopithecidae harboured most. Of 59 examined, 39 were passing *Amoeba* [the different species were not determined except division into those with an iodine vacuole (*Iodamoeba*) and those without], 16 *Blastocystis* and 15 worms or their ova. *Hymenolepis* ova were found in 2 Cebidae and in these only. *Trichuris* ova were passed by 13 Cercopithecids. A table shows the detailed findings of all the examinations made.

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

BLOCK, S. S. (1948.) **Insecticidal surface coatings.**—*Soap & Sanit. Chem.* 24. No. 2. 138–141; 171. No. 3. 151; 153. 2720

Surface coatings consisting of urea-formaldehyde resin and D.D.T., or asphalt varnish and D.D.T., gave excellent control of houseflies. Both coatings with 20% D.D.T. knocked down 50% of the flies in less than ten minutes.

An insecticidal water paint may be prepared by mixing together an aqueous 10% urea-formaldehyde solution with a D.D.T. emulsion concentrate, and painted or sprayed on a white wall without materially affecting the appearance of the wall.—W. MOORE.

SHANAHAN, G. J. (1948.) **Benzene hexachloride (B.H.C.) for prevention of body strike in sheep.**—*Agric. Gaz. N.S.W.* 59. 98. 2721

A dispersion of 0.32–0.5% benzene hexachloride was applied to two groups of 100 sheep carrying approximately six months' growth of wool. One group was treated with a spray or shower dip and although spraying was repeated three times for periods of two min. each, with one min. between sprayings, and 1.3 gal. of dispersion were removed per sheep, the fleece was not completely wetted. A second group was treated by "jetting" over the back and withers with a three-jet nozzle, using 60 lb. pressure per sq. in. and allowing 0.25 gal. per sheep.

During the following three weeks there were 19% fly strikes on the bodies of 300 control sheep, no strikes in the group treated with the shower dip, and four strikes in the group treated by jetting, but three of these strikes were in areas beyond that exposed to the benzene hexachloride dispersion.—H. McL. GORDON.

KING, W. V. & GAHAN, J. B. (1949.) **Failure of DDT to control house flies.** *J. econ. Ent.* 42. 405–409. [Authors' summary copied verbatim.] 2722

Reports have been received of the failure of DDT residues to control house flies, *Musca*

Attention may be drawn to the presence of *Amoeba* in 8 out of 9 Suidae, 11 out of 13 Cervidae, 13 out of 26 Antelopidae and 7 out of 21 Bovidae. Except for the Cercopithecids mentioned above, helminthic infestations were rare. No amoebae were seen in any Carnivora.

Summing up the findings: amoebae of one kind or other were present in 95 of the 244 (38.9 per cent.) and 65 harboured helminths (26.6 per cent.). [Future papers may reveal details of more interest. These questions have been studied at the Zoological Society of London for many years and among a much larger number of animals.]

domestica L., under conditions in which the treatments had formerly been highly successful. The chief factor involved appears to be an increased resistance of the flies to this insecticide, probably a result of exposure in treated buildings over a period of 1 to 4 years. Samples of flies obtained from seven localities in five states all showed a greater resistance to DDT residues than that of two laboratory colonies that had never been exposed to this compound. All samples, however, were much more susceptible than a special resistant colony that has been developed experimentally at Orlando during the past 32 months.

No evidence has been obtained that inferior quality of DDT used this year was involved, or that freshly applied residues on the walls of buildings were less toxic than formerly. Heavy deposits of DDT (0.8 to 4 gm. per square foot) showed some repellency to flies, but the more usual dosage of 0.2 gm. was practically nonrepellent. Heavy deposits of wettable chlordan and methoxychlor were nonrepellent or even slightly attractive. Technical benzene hexachloride was somewhat more repellent and a partially refined product somewhat less repellent than DDT. Preliminary tests indicated that the increased resistance to DDT was much greater than it was to methoxychlor, chlordan, and benzene hexachloride. Re-spraying of two barns with chlordan emulsions, and two with suspensions of methoxychlor provided a high degree of control for several weeks.

WEBB, J. E., & GREEN, R. A. (1945.) **On the penetration of insecticides through the insect cuticle.**—*J. exp. Biol.* 22. 8–20. [Abst. in *Exp. Sta. Rec.* 95. 222. (1946), slightly amended.] 2723

Using *M. ovinus* as the test insect, the authors found that certain organic solvents (e.g., cresols, benzyl alcohol, 4-methyl-cyclohexanol) greatly increased the rate of action of diphenylamine; others (e.g., carbitol, methyl benzoate) gave little or no improvement in killing time. The

degree to which a solvent induces rapid penetration of an insecticide is referred to as its "carrier efficiency". A high carrier efficiency was found to be correlated with a high rate of penetration through beeswax, a high partition coefficient of the solvent between beeswax and water, and a high solubility of insecticide in a water solution of the solvent; the volatility of the solvent and the solubility of the insecticide were also contributory factors. Mixtures of two solvents, each exhibiting no carrier efficiency but together possessing all the essential physical properties, revealed a carrier efficiency considerably higher than either alone; this is taken as supporting evidence that carrier efficiency depends on certain physical properties of the solvent. With a range of solvents having various degrees of carrier efficiency, comparable results were obtained in the use of dioxanthogen, ω -nitro-styrene dibromide, and rotenone, showing that the synergy could be extended to other insecticides. It is suggested that certain solvents increase the rate of penetration of contact insecticides through the insect cuticle by (1) transporting the insecticide through the lipid elements of the epicuticle to the interface between it and the water permeating the exocuticle, (2) concentrating the insecticide at the interface between epicuticle and exocuticle and thus increasing the diffusion gradient of the insecticide across that interface, and (3) increasing the solubility of the insecticide in the water permeating exo- and endocuticles and thus further increasing its rate of diffusion, not only across this interface but also through exo- and endocuticles to the hypodermis.

LEES, A. D. (1947.) **Transpiration and the structure of the epicuticle in ticks.**—*J. exp. Biol.* 23. 379-410. 2724

Using a technique described by WIGGLESWORTH (1945) [*J. exp. Biol.* 21. 97], L. determined the rate of water loss in various species of ticks. He confirmed earlier work which showed that the exposure of whole insects (with spiracles covered) to different constant temperatures for short periods resulted in a water loss increasing with temperature. At a certain critical temperature, transpiration increased sharply. This critical temperature varied widely in different species, in Ixodidae ranging from 32°-45°C., and in Argasidae from 63°-75°C. The critical temperature showed a correlation with the habit of the tick and the host; thus, species such as *Ixodes ricinus*, which can survive only in a high humidity, had a low critical temperature and a correspondingly high rate of transpiration, compared with such species as *Ornithodoros savignyi*, which normally occur in the loose, dry sand of desert regions. Ticks with habits intermediate

between such extremes had critical temperatures and rates of transpiration to correspond.

Water is conserved in two ways. Evaporation is stopped primarily by a superficial layer of wax in the epicuticle: evaporation is greatly increased by damage to this (e.g., by rubbing with abrasive dust); but this can be partially repaired in the living tick by secretion of wax from the pore canals. Further, the secretory activity of the epidermal cells in the unfed tick provides an effective mechanism of water uptake. But, here again, damage by abrasion to only a small part of the cuticle produces an effect comparable to wound shock, and inhibits this function completely. Before the damage to the waterproofing layer is completely repaired the full powers of water uptake, initially arrested by abrasion, are restored. Resistance to desiccation is thus achieved by both of the above methods.

The nature and origin of the various layers composing the epicuticle in different species, and the action of chloroform and detergents on them, are described, and the bearing of these findings on the action of insecticides is discussed briefly. [See also preceding abst.]—E. PARKER POLLARD.

ORTIZ MARIOTTE, C., & CALDERÓN, C. (1948.) Hexaclorocicloexano, su efecto en la garrapata común del perro en México. Prueba de laboratorio—Informe preliminar. [The effects of hexachlorocyclohexane on dog ticks in Mexico.]—*Bol. Ofic. sanit. pan-amer.* 27. 719-723. [Abst. in *Trop. Dis. Bull.* 46. 351. (1949), copied *verbatim*. Signed: H. J. O'D. BURKE-GAFFNEY.] 2725

The commonest dog tick in Mexico is *Rhipicephalus sanguineus*, which abounds in the northern States, where it is considered to be an important vector of Rocky Mountain spotted fever. The authors describe a number of experiments indicating the lethality of gammexane to ticks. The advantages of this substance and its comparative absence of toxicity to domestic stock suggest that it may enable the control of "spotted fever" to be achieved. Satisfactory results were obtained with DDT in La Laguna in 1947, and the authors suggest that comparative studies be made in areas of Mexico where *R. sanguineus* is prevalent, to ascertain the relative practical and economic values of DDT and gammexane in controlling this vector of the disease.

ANANTARAMAN, M. (1948.) **Oribatid mites and their economic importance.**—*Nature, Lond.* 161. 409-410. 2726

The oribatid mites, remarkable amongst the Acarina for their herbivorous or saprophagous habit, were regarded as non-injurious until Stunkard found that *Zetes (Galumna) emarginatus* was an intermediate host for *Moniezia expansa*.

Since then, a number of workers have found that various oribatid mites act as intermediate hosts of other anoplocephalid cestodes, and the group

must now be considered to be of major importance in veterinary parasitology. [See also *V. B.* 10. 182, 263 & 522; 12. 383 & 594; 13. 288.]

—E. PARKER POLLARD.

See also absts. 2719 (on Zoo animals); 2842 (guide to medical entomology).

PARASITES IN RELATION TO DISEASE [HELMINTHS]

BRUMPT, E., & BUTTNER, A. (1949.) Pouvoir infectieux des métacercaries d'échinostomides. [Infectivity of the metacercariae of echinostomes.]—*Ann. Parasit. hum. comp.* 24. 9–15. 2727

This paper considers experimental evidence of the infection of birds with the metacercariae of echinostomes. Most workers have found that very few adult parasites develop in the definitive host even after massive dosing. This conclusion was confirmed as the result of feeding domestic fowls, ducks and geese on metacercariae (principally *Echinoparyphium recurvatum* and *Echinostoma revoltum* from *Lymnaea auricularia*).—S. B. K.

PELLEGRINI, D. (1947.) Il "Cisticercus dromedarii" n. sp. nel cammello e relativa cisticercosi. [*Cysticercus dromedarii*, a new species in camels.]—*Boll. Soc. ital. Med. Igiene trop., Eritrea.* 7. 317–324. [English summary.] 2728

P. claims to have found a cysticercus in camels in Somaliland and as he cannot trace its identity with any previously described in the literature, he thinks that it may be of a new species. He notes that MASON in 1919 in Egypt described a cysticercus in camels, but cannot collate this with his discovery.

The cysticercus is found in about 23% of camels and is chiefly located in the liver, after which the main sites are the heart, the masseter muscles, the tongue, the cervical muscles and finally the lungs. The scolex has a twin crown of hooks which vary in number between 36 and 44, the usual being 38–40.

P. supports his statement as to this being a new species by giving morphological and biometric data, the results of several biological tests and epidemiological observations.—D. S. R.

WESTERMARCK, H. (1948.) Hiilitetrakloridin ja rikkihiilen käytöstä suolistolaisia vastaan sekä näiden lääkkeiden aiheuttamista myrkytyksistä. [Use of carbon tetrachloride and carbon disulphide as anthelmintics and their toxic effects.]—*Suom. Eläinlääkäril.* 54. 329–333. 2729

This is an account of the use of anthelmintics in equine practice in Finland with special reference to toxicity. Phenothiazine, and also carbon tetrachloride, caused some trouble in thoroughbred horses especially when impure material was used. The carbon tetrachloride dosage for Finnish

horses is said to be 10 ml. per 100 kg. body weight.

Carbon disulphide is used in a dosage of 5 ml. per 100 kg. body weight. It was used along with phenothiazine against horse bots, strongyles and ascarids in total dosage of 20–80 ml. of carbon disulphide and 10–20 g. of phenothiazine. Carbon tetrachloride was used to a small extent in dosage of 10 mg. per 100 kg. followed by 1–5 g. of phenothiazine daily for a week. [Not clear whether carbon disulphide is repeated.]—J. E.

ROTH, H. (1949.) Trichinosis in Arctic animals. [Correspondence.]—*Nature, Lond.* 163. 805–806. 2730

An outbreak of trichinosis in human beings appeared in North Eastern Greenland in 1947. Most of the cases appeared to be associated with the eating of walrus meat.

Meat samples from various mammals in Greenland were examined to find possible sources of infection. Seventy per cent. of sledge dog meat samples were infected. Trichinella were found in six out of 19 polar bears and in 3% of arctic foxes examined. There was a heavy infection in one bearded seal, this being the first record of the parasite in a marine mammal. R. considers that infection of walrus meat is quite feasible although in none of the 133 walruses examined was there any evidence of infection.—D. LUKE.

EIELAND, E. (1948.) Trikinose hos isbjørn [Trichinosis in polar bears.]—*Norsk Vet Tidsskr.* 60. 414–416. [Abst. from English summary.] 2731

In 1948 trichinella were detected in polar bears from Spitzbergen. Altogether, trichinella have hitherto been found in seven of nine such polar bear skins examined in Norway. The author infers that trichinosis is prevalent among polar bears in the Arctic regions.

Several samples of meat from different species of whales, finback and spermwhale, were examined for trichinella, but with negative results.

GORDON, H. McL. (1948.) Control of worm parasites of sheep.—*Qd. agric. J.* 67. 33–54. 2732

The uses of anthelmintics and other control measures are discussed in semi-popular style. The uses and dose rates of phenothiazine, copper sulphate-nicotine mixture, carbon tetrachloride,

copper sulphate-arsenic mixture and tetrachloroethylene are outlined. Particular attention is given to the preparation and administration of phenothiazine in order to avoid staining of the fleece.

Considerations of husbandry are discussed from the points of view of rate of stocking, nutrition and age of sheep.

Control of *Oesophagostomum columbianum* is given a special section owing to its great importance in the summer rainfall regions concerned.

[There is an error in the mixture of copper sulphate-arsenic pentoxide; for one and a half oz. arsenic pentoxide read two and a half oz.]

WILLIAMS, W. J., SCHELLING, V., & HARTMAN, F. W. (1949.) **Action of some alkylhydroxybenzenes on pig ascaris in vitro.**—*Amer. J. trop. Med.* 29. 241-245. 2733

The pig ascaris was used as an indicator of anthelmintic properties in *in vitro* tests using certain alkylhydroxybenzenes likely to be of value in human infestations.

The difficulties of the *in vitro* test as a criterion for evaluating anthelmintics are discussed. The introduction of certain halogens in these compounds appeared to increase their anthelmintic properties.—D. LUKE.

TRENT, S. C. (1948.) **Anthiomaline and neostibosan in the treatment of filariasis (*Dirofilaria immitis*).**—*Puerto Rico J. publ. Hlth.* 23. 311-360. [Abst. in *Trop. Dis. Bull.* 46. 276. (1949), copied *verbatim*. Signed: J. D. FULTON.] 2734

After treatment with anthiomaline, a tervalent Sb compound, reduction or disappearance of microfilariae in various filarial infections has been reported. The effect of this drug on the microfilariae and adult forms of *Dirofilaria immitis* in the naturally infected dog was therefore investigated. After microfilarial counts had been performed in 6 dogs for some days to note the variations in numbers present, the animals were treated with 0.8 mgm. Sb per kilo intravenously

See also absts. 2719 (on Zoo animals); 2750 (haemonchosis); 2774 (hookworms in dogs); 2792 (phenothiazine).

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

RUST, J. H. (1949.) **Transmissible lymphosarcoma in the dog.**—*J. Amer. vet. med. Ass.* 114. 10-14. 2735

R. describes 12 cases of transmissible lymphosarcoma in dogs and reviews the literature dealing with transmission, structure, immunity, control and treatment.

[JACKSON, C. (see *V. B.* 9. 106.), gave an account of this subject.]—A. R. JENNINGS.

HUMMEL, K. P., & LITTLE, C. C. (1949.) **Studies on the mouse mammary tumor agent. I. The agent in blood and other tissues in relation to**

till the parasites disappeared from the blood, which occurred in 10 to 22 days. The dose of Sb required to cause disappearance appeared to be unrelated to the numbers of microfilariae originally present. Two further doses of the drug were then administered and over a subsequent period of 12 weeks no parasites were found in blood. Changes in their structure or motility had not been observed during treatment. Six other naturally infected dogs served as controls in these experiments. In one treated dog autopsy was performed 2 days after disappearance of microfilariae, and fragmented forms of the latter were found in the tissues of blood vessels, in lungs and in kidneys, apparently being ingested by phagocytes. The drug, which was non-toxic in the above doses, therefore appeared to be rapidly effective against these young forms. The chief pathological lesions found in the remaining 5 dogs were in lungs and kidneys. Of 36 adult worms found, however, only 10 were dead and in them few pathological lesions were present. Developing forms, however, were generally absent from the uteri, and, in the male spermatozoa appeared to be affected. The authors doubt the value of anthiomaline against the adult worms.

Neostibosan, a pentavalent Sb compound, has also been stated to be active against various microfilariae. Its effect was therefore studied as above in the same infection in 6 dogs. In a first course of therapy, 10 mgm. Sb per kilo were given five times weekly—total 14 doses. At the end of 11½ weeks, microfilariae were still present but in greatly reduced numbers. Re-treatment was begun, toxic symptoms became apparent and were followed by the deaths of some dogs. At the end of a further period of 12 weeks microfilariae were absent from the blood. Results showed, however, that neostibosan was not effective against the adult worms, since 63 of 76 worms found in autopsy were motile, and ovaries and testes were normal.

the physiologic or endocrine state of the donor. —*Cancer Res.* 9. 129-134. [Authors' summary slightly amended.] 2736

HUMMEL, K. P., LITTLE, C. C., & EDDY, M. S. (1949.) **Studies on the mouse mammary tumor agent. II. The neutralization of the agent by placenta.**—*Cancer Res.* 9. 135-136. [Authors' summary copied *verbatim*.] 2737

HUMMEL, K. P., & LITTLE, C. C. (1949.) **Studies on the mouse mammary tumor agent. III. Survival and propagation of the agent in transplanted tumors and in hosts that grew these**

tumors in their tissues.—*Cancer Res.* 9. 137–138. [Authors' summary copied *verbatim*.] 2738

I. Blood, whole or separated into cells and plasma, and other tissues were inoculated into suitable test animals. The blood, except when it is from females with spontaneous mammary cancers, is a relatively poor source of the mammary tumor agent. The agent is present in very small amounts in plasma, as compared with the cell fraction. There is evidence that the spleen and liver contain the agent only by virtue of their contained blood, although the spleen is a better source when inoculated subcutaneously than is the liver. The agent was not recovered from clotted blood, fetal blood, or placenta. Either the agent is not present, or its activity is inhibited in blood during late pregnancy. Stomach milk from 4- to 11-day-old mice is shown to be a good source of the agent.

II. A filtrate of spontaneous mammary tumor induced tumors in 36 per cent of the inoculated animals. The filtrate, mixed and incubated with minced liver, induced tumors in 16.6 per cent of inoculated animals. This is interpreted as due to the autolytic processes going on in the minced tissue, and evidence is presented that no great inhibition of the agent takes place in the livers of living animals. The filtrate mixed with minced placentas induced tumors in 3.5 per cent of the inoculated animals. Some of this decrease in activity is probably due to autolysis; but, as blood in females in late pregnancy apparently carries none of the agent, the evidence seems to indicate that the placenta actively destroys or inhibits the agent.

III. A spontaneous mammary adenocarcinoma of an A strain female was transplanted through 34 passages in mice without the agent. The agent was present in the tumor after the first, fifth, and tenth passages, as shown by the development of tumors in suitable test animals that had been inoculated with extracts of the tumor. The agent was transferred to the host tissues from tumor cells grown a short time in the ears of mice not having the agent, and it induced mammary gland tumors in some of these hosts.

BITTNER, J. J. (1949.) **Some enigmas associated with the genesis of mammary cancer in mice.**—*Cancer Res.* 8. 625–639. [Author's summary copied *verbatim*.] 2739

The interpretation of data on the genesis of mammary cancer in mice, where the disease results from the interaction of several causative factors, is becoming more difficult as shown by a review of the results of various experiments.

Because of the isolation of sublines within inbred strains of mice, the possible influence of the altered genetic constitutions as well as environ-

mental factors upon the final results, controls should be maintained for each experimental series.

The physiological response of animals of various stocks following castration has been found to be dependent upon the genetic constitution of the animals. In several strains an association has been found between adrenal hyperplasia, with estrogenic stimulation of the secondary sex organs, and the inherited hormonal influence. The possibility of other inherited hormonal factors is discussed.

As the basis for further research, it is suggested that the role of the mammary tumor milk agent in the genesis of mammary cancer in mice may be to alter hormone metabolism with the production of more "carcinogenic" hormones.

SMITH, F. W. (1948.) **The relationship of the inherited hormonal influence to the production of adrenal cortical tumors by castration.**—*Cancer Res.* 8. 641–651. [Author's summary copied *verbatim*.] 2740

The three factors known to influence the growth of mammary tumors in inbred strains of mice have been studied in relationship to the formation of adrenal tumors following castration.

One of these factors, modifying hormonal activity in breeding and virgin mice, and designated as the inherited hormonal influence was observed to be in castrated mice of the C3H stock and to be transmitted as a dominant to the hybrids between the A and C3H stock but to be lacking in the castrated mice of the A strain.

Adrenal cortical hyperplasia and tumors occurred in those castrated groups with the inherited hormonal factors (C3H, high and low tumor hybrid stocks).

The hyperplastic adrenal glands were suggested as the source of compounds similar to those released by the ovary in the intact animal. These hormones are believed to be responsible for the evidence of hormonal activity in the vagina, uterus and mammary glands.

Mammary tumors were present in the castrated mice with the inherited hormonal influence provided an active milk agent was present (C3H, high tumor hybrids).

The castrated mice of the A strain, lacking the inherited hormonal influence even in the presence of the genetic susceptibility to mammary tumor formation and an active milk agent, had slight adrenal lesions and little or no indication of hormonal stimulation of the uterus, vagina or mammary glands.

The action of the inherited hormonal influence is probably mediated at least in part through the hypophysis.

SYMMEERS, D. (1948.) **Lymphoid diseases, Hodgkin's granuloma, giant follicular lymphadenoma.**

pathy, lymphoid leukemia, lymphosarcoma and gastrointestinal pseudoleukemia.—*Arch. Path.* 45. 73–131. 2741

S. reviews these conditions. He considers that they are all primarily diseases of the lymphoid tissue of the abdomen and/or the thorax.

He suggests that Hodgkin's disease is produced by myeloidization of the lymphoid structures, following deposition of cells derived from the bone marrow.

Giant follicular lymph-adenopathy is well reviewed and its "transformability" is stressed. It is stated that it may develop into Hodgkin's disease, lymphatic leukaemia, or a polymorphous cell follicular sarcoma. The condition is said to be very amenable to radiation therapy.

S. divides lymphatic leukaemia into (a) a group with enlargement of the lymph nodes and no enlargement of the spleen and (b) a group with relatively little enlargement of the lymph nodes, but a much enlarged spleen.

He discusses the so-called lympho-sarcoma of dogs and draws a parallel between this condition and lympho-sarcoma in man. Human lympho-sarcomata he divides into five main groups and suggests a virus as the underlying cause.

Gastro-intestinal pseudo-leukaemia is characterized by extreme lymphoid hyperplasia of the alimentary tract. The condition is said to lack the infiltrating and destructive qualities of a malignant tumour.—A. R. JENNINGS.

KREJCI, L. E., ROSS, M. H., & SWEENEY, L. (1948.) **Plasma changes in fowls with a transmissible multiple lymphoma.**—*Cancer Res.* 8. 575–580. [Authors' summary copied *verbatim*.] 2742

Electrophoretic analyses were made of the blood plasma of chickens inoculated with RPL 16 strain of lymphoma. Rapid tumor growth was consistently accompanied by a reduction in albumin concentration, occasionally by a reduction in the concentrations of the globulins as well. The concentration of gamma globulin rose abruptly when tumor regression occurred; complete regression appeared to be followed by a return to the normal. The inoculation of inactive tumor tissue caused plasma changes similar to those found during tumor regression.

LUCAS, A. M. (1947.) **Intranuclear inclusions in the islands of Langerhans of chickens.**—*Amer. J. Path.* 23. 1005–1021. 2743

These intranuclear inclusions were detected during cytological investigations into the nature of lymphomatosis. No inclusions were seen in birds under 30 days old. They were detected in 230 out of 235 birds over 30 days old. The character of the inclusion bodies suggested the presence of a virus. Apart from coccidiosis the only disease known to exist in the stock was lymphomatosis.

On the basis of gross lesions there appeared to be no correlation between naturally occurring lymphomatosis and the presence of these cell inclusions, though it is theoretically possible that many or all of the birds were carrying the causal agent of lymphomatosis.

The author discusses the significance of these inclusions in connection with—(a) lymphomatosis; (b) possible latent virus infections; and (c) possible association with some unknown function of the pancreas.—D. LUKE.

NUTRITIONAL AND METABOLIC DISORDERS

ANON. (1949.) **Yeast for human and livestock feeding.**—*Nutr. Rev.* 7. 86–88. 2744

A useful summary of recent publications upon fodder yeast. Among the points of interest are: at the end of hostilities the yeast plants in six German cities had capacities in excess of 25,000 tons a year, while further plants were under construction; among the sources of carbohydrate in Germany were the still bottoms from the alcoholic fermentation of wood sugars, containing large quantities of pentoses, especially xylose and arabinose; fodder yeast found wide acceptance as a human food in Scandinavian countries as well as in Germany, but as a supplementary rather than as the principal protein of the diet, 20 g. *per diem* being considered a desirable quantity; when fed to cows during experiments in New Hampshire, wood yeast was without effect (as judged by blood levels of sugar, uric acid and cholesterol) and was found to have a digestibility of 97.6% and to

provide metabolizable energy at the rate of 8 calories per g. of dried yeast; *Torula* yeast is an excellent source of protein for the pig, although its P content is so high that it may lead to rickets in animals kept indoors unless balanced by additional Ca; yeast protein is high in lysine and valine, and hence is especially useful in conjunction with cereal diets, but is low in methionine; the bitter taste of *Torula* yeast is less pronounced than that of brewers' yeast; recent work indicates that it is possible by using individual strains to produce specific desired dietary constituents in preponderating amounts, *e.g.*, some strains are capable of producing up to 60% of their own dry weight of fat, at conversion efficiencies up to 18% of the carbohydrate consumed; over-all yields of yeast from cellulose have averaged 20–25% protein yield, calculated on the carbohydrate used, whereas the feeding of carbohydrate to pigs would result in a protein yield of about 5%.

The authors, summarizing the results of a symposium held in Milwaukee, emphasize the importance to the world food situation of attention to large-scale yeast culture.—A. N. WORDEN.

LOPEZ BUSTOS, C. (1946.) Posibles interpretaciones bioquímicas del latirismo. [The possible biochemical causes of lathyrism.]—*Rev. San. Hig. públ., Madr.* 20. 1027–1045. [Abst. from abst. in *Trop. Dis. Bull.* 46. 169–170. (1949), signed: H. HAROLD SCOTT.] 2745

In a detailed study of the vetches, the author discusses the results of chemical analyses of these plants.

The possible connexion between these findings and the symptoms of lathyrism is largely, if not entirely, hypothetical. It is acknowledged that vegetal phospholipids, though not themselves antineuretic, nevertheless retard the appearance of symptoms of avitaminosis. The author considers the nutritional value of the plant and the pyrimidine bases and lathyrism, quoting many references to the literature. He then proceeds to discuss the soil factor, showing that not all vetches are toxic, but only (or chiefly) those grown on certain soils, particularly those containing selenium and he concludes in these words (translated): "We do not think that lathyrism is due to deficiency of amino-acids, although the proteids of the flour are poor in sulphurated amino-acids. . . . The cause of lathyrism may be the toxic action of nucleic acids or the products of their hydrolysis, while the colouring matter may have a harmful action. . . . There is also the possibility that the toxic symptoms may be due to selenium in combinations analogous to the sulphur of the sulphurated amino-acids."

I. CLARK, R. (1948.) Studies on the alimentary tract of Merino sheep in South Africa. XIV.—The effect of some commonly used antifermentatives on the *in vitro* formation of gas in ruminal ingesta and its bearing on the pathogenesis of bloat.—*Onderstepoort J. vet. Sci.* 23. 389–393. 2746

II. HOELUND, S., QUIN, J. I., & CLARK, R. (1948.) Studies on the alimentary tract of Merino sheep in South Africa. XV.—The influence of different factors on the rate of cellulose digestion (a) in the rumen and (b) in ruminal ingesta as studied *in vitro*.—*Ibid.* 395–409. 2747

I. Owing to the increasing use of lucerne, the incidence of bloat is increasing in South Africa and some experiments were carried out with drugs which are supposed to inhibit gas formation. It was found that neither turpentine nor coal tar derivatives influence gas formation, their beneficial effects being most probably due to their action

on surface tension thereby enabling the gas to escape from the frothy ingesta characteristic of bloat. Turpentine still remains the best drug for general use and in critical cases it should be administered directly into the rumen through a cannula.

II. The rate of cellulose breakdown in the rumen was studied by inserting cotton threads attached to a thin metal rod covered by a close-fitting rubber tube, through a fistula into the rumen. A cork stopper on the end of the metal rod kept the threads at any desired depth in the ruminal mass and they could be withdrawn by means of the rod at suitable intervals.

It was found that the rate of cellulose digestion was greatly influenced by the diet. On poor quality grass hay both cellulose digestion and appetite were stimulated by the addition of small amounts of sugar to the diet, but depressed by excess sugar. Optimal cellulose digestion required a balance between readily available carbohydrate and protein. Excess protein caused marked inhibition of cellulose digestion and death in one case. It is concluded that any supplement to a highly fibrous diet must contain balanced amounts of both protein and carbohydrate.—J. A. N.

COLE, H. H., & KLEIBER, M. (1948.) Studies on ruminal gas formation and on consumption of alfalfa pasture by cattle.—*J. Dairy Sci.* 31. 1016–1023. 2748

In two lactating Jersey cows alfalfa tops gave a greater volume of gas than an equal weight of Sudan grass (*Sorghum vulgare*) tops, but when fed *ad libitum* three times more Sudan grass was consumed and the total gas production was about the same as for alfalfa. A glucose solution introduced into the rumen 20 hours after a feed of Sudan grass gave a quicker increase in gas formation than a starch solution similarly introduced, but the total gas production in four hours was very similar in each case. Both solutions had the same effect when introduced immediately after a feed of alfalfa tops.

The results on the consumption of alfalfa pasture were considered inconclusive, but indicated that palatability increases with maturity up to the early bloom stage.—J. R. PICKFORD.

BARNICOAT, C. R., LOGAN, A. G., & GRANT, A. I. (1949.) Milk-secretion studies with New Zealand Romney ewes. Parts I and II.—*J. agric. Sci.* 39. 44–55. 2749

In a trial extending over three years, the authors measured milk output of ewes by allowing lambs to be suckled only 4–6 times daily and weighing them before and after suckling. The method appears to have been sufficiently accurate for experimental purposes. From analysis of milk

samples it was found that fat content varied widely, even in milk removed from the same ewe on different days, but solids-not-fat were fairly constant. During a 10-12 week lactation, average daily milk yield of over 100 breeding ewes (average age four years) with single lambs varied from 45-53 oz. Ewes with twin lambs produced about one-third more than those with singles, and this was not associated with pre-natal influences, as twin bearing ewes rearing single lambs yielded no more milk than ewes with single pregnancies. Assuming a yield during the first nine weeks of lactation of 40-60 oz. milk per day to be satisfactory for fat lamb production, 15% of the experimental animals were below, and a similar number above this standard. Two-year-olds do not produce as much milk as older ewes. Lower yields in late lambers were thought to be associated with poorer quality pasture.

During 1945, 42 ewes were divided into four groups and fed as follows:—(1) generous diet throughout the year (high/high); (2) low diet throughout the year (low/low); (3) generous diet during pregnancy, and low diet after lambing (high/low); (4) the reverse of group (3) (low/high). Lambs from low plane ewes were of lower birth weight than the others. Milk yields were markedly influenced by diets, average yields in gal. per 12 weeks for groups (1), (2), (3) and (4) being: 26, 13, 18, and 23 respectively. Maximum yield is only obtained by liberal feeding during late pregnancy and throughout lactation.—G. B. S. H. WEIR, W. C., BAHLE, T. L., POPE, A. L., PHILLIPS, P. H., HERRICK, C. A., & BOHSTEDT, G. (1948.) **The effect of hemopoietic dietary factors on the resistance of lambs to parasitism with the stomach worm, *Haemonchus contortus*.**—*J. Anim. Sci.* 7. 467-474. 2750

Experiments on the relation of various dietary factors to lambing performance and the resistance of lambs to nematode infection are reported. A basal diet of mixed grass-legume hay was given to all groups; one group was supplemented with minerals, one with protein, and one with minerals plus protein. Worm-free lambs were produced from 12 ewes in 1946 and from 32 ewes in 1947.

In both experiments, the control group, on basal diet alone, produced the lightest lambs; while the group receiving supplementary minerals and protein produced the heaviest. Lamb mortality was highest in the groups not receiving minerals.

When a portion of the lambs from each group was infected with *H. contortus*, it was found that the period before the eggs appeared in the faeces was several days shorter in the groups receiving minerals than in the other groups. Similarly, the

groups receiving minerals were found on P.M. examination to have significantly higher worm burdens. Deaths due to heavy nematode infections in lambs were highest in the groups not receiving a high protein ration.

The haemoglobin levels in all groups were depressed by infection, but least in the group with protein supplement. Results with other blood constituents (blood plasma vitamins A and C, inorganic phosphorus, and total plasma protein) were inconclusive.

Generally speaking, supplementary minerals appeared to assist the host in moderate infections (15,000 larvae), but seemed to operate in favour of the parasites in high infections (45,000 larvae).

—E. PARKER POLLARD.

SILVER, M. L., ZEVIN, S. S., KARK, R. M., & JOHNSON, R. E. (1947.) **Canine epilepsy caused by flour bleached with nitrogen trichloride (agene). I. Experimental method.**—*Proc. Soc. exp. Biol., N.Y.* 66. 408-409. 2751

Details are given of a diet having a 75% flour component and including supplementation with accessory food substances, also of a similar diet the flour being agenized at the rate of 30 g. nitrogen trichloride per 100 g. flour. When the control ration was fed to dogs of 5-10 kg. weight, they gained weight and in a period up to 45 days developed no signs of neurologic disorder or deficiency disease. When the experimental diet containing the bleached flour was fed to 24 dogs all developed canine epilepsy within five days [see *V. B.* 18. 375].

The fat was extracted from agenized flour and from feeding tests it was found that the toxicity remained in the flour fraction while the fat was not toxic.

In monkeys the experimental diet caused no convulsions but the monkeys developed a tremor of the extremities and weakness of the hind limbs within five days.—E. M. J.

SILVER, M. L., MONAHAN, E. P., & KLEIN, J. R. (1947.) **Canine epilepsy caused by flour bleached with nitrogen trichloride (agene). II. Role of amino acids.**—*Proc. Soc. exp. Biol., N.Y.* 66. 410-412. [Authors' summary copied *verbatim*.] 2752

When an amino acid mixture approximating the composition of gliadin is treated with nitrogen trichloride gas (NCl₃) this mixture is so altered as to make it convulsant for dogs when given intravenously. The convulsant activity is most readily demonstrated in dogs which have been on a bleached (agenized) flour diet for 5 to 7 days, presumably because these animals have accumulated sufficient quantity of the toxic material *via* the alimentary tract, to make them highly sus-

ceptible to an additional increment received *via* the blood stream.

BOUDREAU, F. G. (1947.) **Nitrogen trichloride treated ("agenized") flour.**—*J. Amer. Med. Ass.* 135. 769–770. 2753

B. discusses the findings of authors concerning the toxicity of agenized flour [see MELLANBY, *V. B.* 17. 33, & 18. 374, 375.] and gives the authorized statement of The Food and Nutrition Board of the National Research Council, Washington, issued as a result of consideration of these facts. The recommendations are:—the endeavour to isolate the toxic product(s) should be continued; to determine more conclusively whether human beings are susceptible and to develop a method for the quantitative determination of the toxic substance for flour inspection purposes; to consider the use of alternative processes of flour treatment, such as with chlorine or chlorine dioxide; to encourage development of preferred alternative processes and effort needed to overcome engineering difficulties involved. There should be a reduction in the use of "agene"; the amount of nitrogen trichloride applied per unit weight of flour should be restricted to the minimum consistent with a product which can be used satisfactorily in bakeries.—E. M. J.

NEWELL, G. W., GERSHOFF, S. N., ERICKSON, T. C., GILSON, W. E., & ELVEHJEM, C. A. (1948.) **Effect of feeding moderate levels of commercially agenized flour to dogs.**—*Proc. Soc. exp. Biol., N.Y.* 69. 1–2. 2754

Three dogs were fed a diet containing an amount of flour (30%) approximately equal to that used in the average American diet [see also *V. B.* 18. 375.], this flour having been treated with 1.2 g. nitrogen trichloride per cwt. flour; two other dogs were fed a similar diet but containing flour which had been treated with 2.25 g. NCl_3 per cwt.

At the end of 12–14½ months the three dogs had gained weight and remained healthy. There was similarity in the electro-encephelograms of these dogs before and during the period of the test and after 6–8 months the other two dogs given the higher level of NCl_3 had normal electro-encephelograms. None of the dogs developed running fits.—E. M. J.

NEWELL, G. W., GERSHOFF, S. N., FUNG, F. H., & ELVEHJEM, C. A. (1948.) **Effect of administering agenized amino-acids and wheat gluten to dogs.**—*Amer. J. Physiol.* 152. 637–644. 2755

Attempts were made to determine if any changes occurred in the blood of dogs when they developed fits after being fed agene-treated products.

Healthy dogs were maintained on a basal ration for a week or more, during which time blood samples were tested. Agenized wheat gluten was then substituted in the ration in place of casein and blood samples were taken for several days after the onset of fits. No significant differences were observed between values for haemoglobin, haematocrit, red blood cell count, white blood cell count, prothrombin time, glucose, calcium, phosphorus, sulphur or vitamin C of the blood of dogs when fed agenized wheat gluten and when fed the basal ration. There was a definite increase in the blood magnesium and potassium when agenized wheat gluten was fed. Various agenized amino acids including cystine and cysteine reported by SILVER *et al.* [see *V. B.* 18. 375.] to be active, were fed by mixing in the ration, by stomach tube, and by intravenous injection without causing any indication of even a mild fit.

—E. M. J.

RADOMSKI, J. L., WOODARD, G., & LEHMAN, A. J. (1948.) **The toxicity of flours treated with various "improving" agents.**—*J. Nutrit.* 36. 15–25. 2756

The authors review the literature on the effect of agenized flour on dogs. Of flour treated with "improving agents" such as agene, chlorine dioxide, chlorine, oxides of nitrogen, benzoyl peroxide or potassium bromate only that treated with agene gave rise to fits or any other evidence of toxicity in dogs.

Gluten was treated with increasing amounts of nitrogen trichloride (agene) until no further increase in toxicity occurred. A single dose of this product caused typical fits and convulsions in dogs. The ED_{50} (the amount producing an effect in 50% of the animals) was about 3.5 mg. per kg.

Of the constituent amino acids, no toxic effects were obtained with agene-treated tryptophane, acetyl tryptophane, tyrosine, methionine, cysteine or cystine. A pancreatic digest of agene-treated gluten caused fits and convulsions in dogs.

When agene-treated gluten was fed to rats, rabbits, monkeys, g. pigs and cats, rabbits were observed to be of the same order of sensitivity to its toxicity as dogs; cats developed similar symptoms after three administrations. Rats and Rhesus monkeys did not develop any observable central nervous disorders over the prolonged period during which they were fed large amounts of this product. G. pigs did not develop symptoms from a single administration.—E. M. J.

BENTLEY, H. R., BOOTH, R. G., GREER, E. N., HEATHCOTE, J. G., HUTCHINSON, J. B., & MORAN, T. (1948.) **Action of nitrogen trichloride on proteins: production of toxic**

derivatives. [Correspondence.]—*Nature, Lond.* 161. 126–127. 2757

The authors consider that a reactive protein contains a number of centres, *C*, probably of different types, all of which react with nitrogen trichloride; but of these centres only one type, *E*, which may occur at several places in the molecule, is essential for the production of the toxic substance [see MORAN, *V.B.* 18. 374]. The *E* centre is common to most proteins. One or more of the following amino-acids appear to be associated with the *E* centre:—methionine, glutamic acid, tyrosine, phenylalanine, threonine, leucine and *iso*-leucine. There is evidence that the methionine unit contains the *E* centre probably as the —S.CH₃ grouping. Glutamic acid may be involved not as an *E* centre but as an essential environmental or concomitant grouping.

—E. M. J.

BENTLEY, H. R., McDERMOTT, E. E., PACE, J., WHITEHEAD, J. K., & MORAN, T. (1949.) **Action of nitrogen trichloride on proteins: progress in the isolation of the toxic factor.** [Correspondence.]—*Nature, Lond.* 163. 675–676. 2758

The authors give a detailed account of an attempt to isolate the toxic factor from agenzized zein using rabbits as test animals. The toxic material can be recovered from the treated protein by hydrolysis in boiling HCl or more conveniently by pancreatic digestion followed by butanol extraction, phenol extraction, acid hydrolysis and butanol extraction, charcoal and acetone precipitation, electrodialysis, ion-exchange displacement, acetone precipitation and silica gel. At all stages fractions were examined by means of paper chromatography. The authors found that the toxic dose of dry purified material which will cause convulsive fits in a rabbit weighing one kg. was 2 mg., the dose of agenzized zein to give similar results being 5 g.—E. M. J.

BUTLER, J. A. V., & MILLS, G. L. (1949.) **Concentration of the toxic substance from 'agenzized' flour.** [Correspondence.]—*Nature, Lond.* 163. 835–836. 2759

The authors discuss the effects of pancreatic digestion of the gluten of agenzized flour [see MELLANBY, *V.B.* 17. 33]. Details are given of the fractionation and concentration of the toxic substance. A product was obtained which showed four spots on two-dimensional paper chromatography, three of which could be identified as glycine, serine, alanine and the fourth as glutamine running with an almost indistinguishable unknown substance. On further examination of this unknown spot the presence of a toxic substance in it was confirmed by feeding tests. It is

likely that the toxic substance, although closely associated with glutamine, does not give a ninhydrin colour.—E. M. J.

ANTHONY, D. J. (1949.) **Treatment of canine hysteria by raw liver.**—*Brit. Vet. J.* 105. 66–67. 2760

Discussing the difficulty of providing the necessary carnivorous diet for dogs during the war and post-war rationing, the great increase in biscuit feeding and hysteria, A. states that he successfully treated valuable affected gun dogs or working shepherds' dogs by giving an exclusively carnivorous diet consisting of boiled liver or boiled rumen and reticulum of sheep and in addition a tablespoonful of raw minced liver soaked in cod-liver oil twice daily for two or three days or a week, depending on the severity of the case.—E. M. J.

MAGREE, H. E. (1949.) **Treatment of flour by the agene process.**—*Mon. Bull. Min. Hlth publ. Hlth Lab. Serv.* 8. 72–74. 2761

M. discusses the need for the use of agene and reviews the findings of authors on the toxicity of agenzized flour, especially in dogs. Although no ill-effects have been observed in human beings the use of such flour may not be completely devoid of risk for man. Since the use of an improver appears to be necessary, tests on the effects of chlorine dioxide on the baking qualities of flour were found to give as good results as agene without the development of any harmful effects. The United States' Government has decided, as from August 1st, 1949, to make illegal the use of nitrogen trichloride as a flour improver and to recommend instead chlorine dioxide.—E. M. J.

PLATT, H. (1949.) **A case of generalised amyloidosis in the dog.**—*J. comp. Path.* 59. 91–96. 2762

P. described a case of generalized amyloidosis in a 18-year-old male golden cocker spaniel which had a clinical history of prostatic enlargement and a severe suppurative gingivitis. Amyloid deposits were present in the renal glomerular tufts, in the small vessels and in the interstitial tissue of the kidney and other organs.

The relationship between amyloidosis and serum protein levels was discussed. In this case there was a depleted serum albumin and a somewhat raised serum globulin in a sample taken shortly after death.—A. R. JENNINGS.

QUIGLEY, G. D. (1948.) **Further studies with wheat and pullet disease.**—*Poult. Sci.* 27. 647–649. 2763

Field observations by Q. [*V.B.* 15. 196.] indicated that there appeared to be a close association between the feeding of wheat and "pullet disease".

Three different types of wheat were fed to

pens of 50 pullets. Pullets in a control pen were fed maize. In the three wheat-fed pens mortality from "pullet disease" was 8-10%. No evidence of "pullet disease" was seen in the maize-fed birds.

In a further experiment pullets in two pens were fed one of the types of wheat used in the previous experiment. The basic laying mash in one of these pens was fortified with 20 lb. calcium carbonate and 20 lb. sodium bicarbonate per ton. In both pens pullet disease was observed, but there were no deaths. However, in the pen receiving the increased calcium and sodium egg production was much higher.—D. LUKE.

MARSTON, H. R., & LEE, H. J. (1948.) **The effects of copper deficiency and of chronic over-dosage with copper on Border-Leicester and Merino sheep.**—*J. Agric. Sci.* 38. 229-241. 2764

Merino and Merino-Border Leicester crossed sheep were transferred to a pasture which was deficient in cobalt and copper and were then divided into groups containing five sheep each of the same breed. All groups were dosed *per os* with sufficient cobalt, and paired groups of the two breeds were given 0, 1, 5, 50 and 100 mg. of copper per day respectively, also *per os*. Observations were made of body weight, blood copper and haemoglobin levels, fleece quality, reproductive capacity and development of the lambs. A supplement of 5 mg. per day was sufficient to counteract the lowered body weight, low blood copper, anaemia and demyelination in the lambs, but was not in all cases sufficient to restore "crimp" to the wool. 100 mg. per day, and to some extent 50 mg., was an unsafe dose particularly when given to the Border Leicester cross sheep. Symptoms observed were of crises of very high blood copper, haemolysis and of blockage of the kidneys with haemoglobin. In the Border Leicester group death was usual after the first crisis, but the Merinos often survived several crises.—R. MARSHALL.

BRAGDON, J. H., & LEVINE, H. D. (1949.) **Myocarditis in vitamin E-deficient rabbits.**—*Amer. J. Path.* 25. 265-271. 2765

Seventeen young male and female rabbits fed synthetic diets deficient in vitamin E developed severe muscular dystrophy after a few weeks and died. On P.M. examination 15 of the rabbits had foci of acute myocarditis and in five out of 12 animals tested there were abnormal electrocardiographic changes. In control rabbits given the same diets with a supplement of α -tocopherol there was none of these changes. No attempt was made to return affected animals to normal by addition of tocopherol.—J. R. PICKFORD.

PENCE, J. W. (1945.) **Studies on the metabolism of thiamine in swine.**—*Abstracts of Doctoral Dissertations*, 1944. State Col.: Pa. State Col. 1945. Vol. 7. pp. 5-10. [Abst. in *Exp. Sta. Rec.* 94. 248-249. (1946), slightly amended.] 2766

Lots of eight pigs each were fed three levels of thiamine and investigations were made of the thiamine content of the carcasses, employing the thiochrome procedure. The thiamine content of the pork was profoundly influenced by the thiamine intake. The carcasses from pigs which received 3.45 mg. of thiamine per pound of feed were approximately twice as high as in pigs which received only 1.28 mg. There was a still higher thiamine content of the muscle from pigs receiving 5.76 mg. of thiamine per pound of feed than in pork from pigs receiving smaller amounts of thiamine. The muscle tissue of the pigs contained up to 10 times as much thiamine as the muscle tissue of any other species of animals. Larger amounts of thiamine in the ration increased the thiamine content of the pork, but there were no greater amounts when the feeds contained over 30 mg. per pound. Pork loin consistently contained from 20 to 25 percent more thiamine than pork shoulder. Pork liver showed less response than pork muscle to increased thiamine. When an increase of 2.5 times the intake caused an increase of 100 percent in the muscle thiamine, there was an increase of 40 to 50 percent in the liver thiamine. The thiamine content of tissues from pork carcasses of 19 pigs fed average rations were shoulder 3.6 mg. per pound of fresh lean tissue, loin 4.5 mg. per pound, and ham end of loin 4.7 mg. per pound of tissue.

In other experiments in which pigs were fed 50 mg. of thiamine daily for 2, 3, 4, and 5 weeks, the pork thiamine values increased rapidly and fairly regularly until a maximum storage level was attained in 35 days. Another group of pigs from which the extra thiamine was withdrawn after 35 days but continued for another 35 days on a normal ration showed that the muscle tissue of the pig displays a high affinity for thiamine, and the loss under this treatment was very slight. Pig blood from 18 animals on normal rations showed an average of 17 μ g. of thiamine per 100 cc. This is considerably higher than the amount found in human or rat blood.

BRAUDE, R., KON, S. K., & WHITE, E. G. (1946.) **Observations on the nicotinic acid requirements of pigs.**—*Biochem. J.* 40. 849-855. 2767

Twenty four Large White pigs nine weeks old divided into six groups were fed a diet deficient in nicotinic acid.

Three groups received varying amounts of nicotinic acid; in a fourth group symptoms of

deficiency were allowed to develop and then the pigs were dosed with nicotinic acid and the other two groups served as controls.

No skin lesions were seen in any of the experimental pigs. Nine pigs died during the experiment; in four of these there were small areas of ulceration in the buccal mucosa and necrotic enteritis was found in five. No haemoglobin estimations were made but a degree of anaemia was seen at P.M. examination and bacteriological examination failed to reveal *Salmonella suispestifer*, even in those with necrotic enteritis. All nine pigs had evidence of pneumonia in both lungs. With one exception all lungs yielded *Pasteurella septica*. In five a *Haemophilus* was also obtained and in one, in addition, *Bacterium coli* was found.

The lungs of eight animals which reached bacon weight were examined bacteriologically; of these five had pneumonic areas and in three a *Haemophilus* organism was isolated. In the sixth there was an apical abscess in each lung, a streptococcus and *Corynebacterium pyogenes* being found in the abscess and *Past. septica* in the lung substance. The pneumonia did not appear to be contagious and deaths usually occurred during a cold spell.

Between 5–10 mg. of nicotinic acid daily was required to prevent or cure the deficiency caused by the diet used.—D. LUKE.

VOGT-MÖLLER, P. (1947.) Ernährungskrankheit bei Rehwild behandelt mit B-Vitaminen. [Nutritional disease of deer treated with B vitamins.]—*Internat. Ztschr. Vitaminforsch.* 19.

116–119. [English & French summaries.] [Abst. in *Nutr. Abstr. Rev.* 18. 79–80. (1948), copied *verbatim*. Signed: A. M. COPPING.] 2768

A deficiency condition, observed in deer at the end of the severe winter of 1940–41, was characterised by poor condition of coat, extreme emaciation, failure of growth in young animals and digestive disturbance with diarrhoea or constipation. Examination of animals which died generally showed very abnormal conditions of the contents of the gut which suggested the possible existence of vitamin B complex deficiency. This was investigated by giving 8 very sick animals injections of a mixture of vitamin B₁, riboflavin, nicotinamide, vitamin B₆ and Na pantothenate. Within 4 days great improvement was seen. One animal was treated with vitamin C without any good effect.

SHAW, J. C. (1947.) Studies on ketosis in dairy cattle. IX. Therapeutic effect of adrenal cortical extracts.—*J. Dairy Sci.* 30. 307–311. 2769

Four cases of uncomplicated ketosis in cattle were examined and the results of treatment with extract of adrenal cortex are reported. Marked improvement in the condition of each animal followed every injection, the animals regained their appetites and the levels of blood glucose and acetone bodies returned to nearly normal.

The similarities between ketosis in cattle and Addison's disease in human beings are discussed. —G. L. BAILEY.

DISEASES, GENERAL

KUDRNA, J. (1948.) Hlavníčka u jalovic na pastvině. [A respiratory disease contracted on the pasture [bovine malignant catarrh].]—*Čas. československ. Vet.* 3. 445. 2770

In July, 1947, a herd of 28 heifers was brought to a pasture near a deserted village in Northern Bohemia. Three weeks after arrival seven developed a condition considered to be bovine malignant catarrh.—E. G.

GOULD, G. N. (1949.) Some conditions of veterinary interest in goats.—*Vet. Rec.* 61. 261–262. Discussion: pp. 263–264. 2771

A general account of G.'s experience of goats and their diseases in the United Kingdom.—D. L.

GWATKIN, R., & PLUMMER, P. J. G. (1949.) Rhinitis of swine. IV. Experiments on laboratory animals.—*Canad. J. comp. Med.* 13. 70–75. 2772

Nasal washings and filtrates from pigs affected with rhinitis instilled intranasally into mature and baby mice, rats, hamsters, g. pigs and

rabbits failed to cause any destruction of nasal tissues in these animals. Subcutaneous inoculation of similar washings with light scarification of the frontal area in mice usually resulted in death, the few survivors developing a localized infection; the bacteria isolated therefrom caused thinning of the frontal bone in one of several mice inoculated in this same manner. However, the same culture had no effect on the turbinated bone structure of a baby pig, nor was bone destruction observed when chicks received injections into the metatarsal bone. On the basis of results obtained so far the authors consider that small laboratory animals are unsatisfactory for study of this disease.—J. L. BYRNE.

SEIFERLE, E. (1949.) Über Nachtblindheit beim Hund. [Night blindness in dogs.]—*Dtsch. tierärztl. Wschr.* 56. 42–44. 2773

A case clinically describable as night blindness in a spaniel was examined in detail and its nature determined through histological examination of

the eyes. The condition was found to be due to degenerative changes in the retinal and optic nerve endings. The histology of the affected nerves is described.—J. E.

CHESNEY, R. W. L. (1949.) **An investigation into a disease of hound whelps.**—*Brit. Vet. J.* 105. 151–170. 2774

Considerable mortality in puppies in a kennel of foxhounds was investigated during 1947 and 1948. Detailed case histories of a number of litters, results of bacteriological examinations of the bitches, faecal examinations of the puppies and P.M. examinations are given. The laboratory investigations disclosed that some or all of the following were concerned:— β -haemolytic streptococci, *Bacterium coli*, coccidia, ascaris worms and hookworms. Treatment directed against the streptococcal infection by autogenous vaccines, sulphonamides and penicillin was ineffective. An autogenous *Bact. coli* vaccine was later used, but was ineffective. Sulphamethazine appeared to be of some value in treatment. Mortality in puppies appeared to be associated with heavy infections of the dams with hookworm and coccidia. Treatment of the dam prior to whelping with sulphamethazine appeared to be efficacious against the coccidial infection and the puppies born to treated bitches survived.

C. considers that both coccidia and hookworm were concerned and assigns a predisposing effect to the hookworm.

A condition noted in some of the puppies is described as follows:—“the front legs were

See also absts. 2741 (lymphoid diseases); 2746–2748 (bloat); 2751–2761 (canine hysteria); 2763 (pullet disease); 2769 (ketosis); 2821 (epilepsy); 2832–2835 (annual reports); 2840 (postmortem appearances).

POISONS AND POISONING

STERNER, J. H. (1947.) **Tracer isotopes in industrial toxicology.**—*Occup. Med.* 3. 552–559. [Abst. in *Bull. Hyg., Lond.* 23. 113–114. (1948), copied *verbatim*. Signed: R. E. LANE.] 2776

This article gives a brief account of the nature, availability, methods of use and cost of isotopic tracers. Two types exist, the stable and the radio-active; the stable isotope differs from the common form of the element in having a different atomic weight, and identification depends on methods which distinguish between these slight differences in mass. Hydrogen, carbon, nitrogen, oxygen and sulphur are common stable isotopes. Their use in experimental work involves the employment of the mass spectrometer, an expensive instrument. The radioactive tracers are isotopic forms of an element, which emit a characteristic radiation, permitting identification by suitable physical means. There are now some 450 of them.

abducted from the shoulders at right-angles from the normal position. They were flat-chested and being unable to use their front legs, their only means of locomotion was a pushing action with the hind legs and a slithering on the chest.”

[This flat-chested, splayed-out-legged condition has been seen by the abstractor not infrequently in puppies in Ceylon, born in kennels where hookworm infection was very prevalent. It was seen especially in puppies which appeared to have been infected pre-natally with hookworms.]

—M. C.

LEMPKE, R. E., & SCHUMACKER, H. B., Jr. (1949.) **Studies in experimental frostbite. IV. The response of the sympathetically denervated extremity to freezing.**—*Yale J. Biol. Med.* 21. 401–414. [Authors' summary and conclusions copied *verbatim*.] 2775

Our knowledge of the rôle of the sympathetic nervous system in the reaction of an extremity to cold has been reviewed and the response of the sympathetically denervated extremity to severe cold has been studied in the dog. It was observed that sympathectomy does not increase the susceptibility of an extremity to frostbite or influence adversely the end results of frostbite. Suggestive evidence was obtained indicating that the sympathetically denervated extremity may possess some added protection against mild frostbite. The conditions of the experiment precluded deductions concerning the influence of immediate sympathetic interruption in the treatment of frostbite beyond the belief that it would not be harmful.

These isotopes may be secured from the Atomic Energy Commission—distribution is made only to accredited organizations and any experiments with these materials on human subjects must be approved by a special committee.

The apparatus for the analysis of the radioactive isotopes is less expensive than for the stable type, and consists essentially of a Geiger-Müller counter, though special modification and adaptation are often required for some of the biologically valuable isotopes (*e.g.*, H^3 , C^{14} , Na^{22} and S^{35}).

The use of these substances in industrial toxicology is likely to extend. The radioactive isotopes have advantages over the stable isotopes. They can be used in the measurement of activity in the intact animal when the radiation is sufficient and the organ is accessible, and they can be used in conjunction with photographic film, making auto-radiographs of tissues containing radioactive elements. Many problems which have defied solution because analytic procedures were

not sufficiently sensitive may be solved by the use of suitable tracers, and the publication shortly of work in this field is forecast.

A description is given of the relative advantages and disadvantages of the two types of isotopes. The radioactive varieties possess certain health hazards, but in general permit of greater sensitivity in detection. On the other hand, there are no suitable radioactive isotopes known for oxygen and nitrogen. The author stresses the complementary relation of the two types in experimental work.

LIEBERMAN, L. L. (1948.) **Lead poisoning as a cause of fits in dogs.**—*N. Amer. Vet.* 29. 574-577. 2777

L. described illness in six young pet dogs, each with a history that indicated the possibility of lead poisoning. They were odd cases seen in practice. In each case a purge was given immediately and calcium and vitamin D were given *per os* to fix residual lead in the bones.

Four of the dogs died and the lead content of the liver was 7-30 p.p.m., sufficient to indicate lead poisoning. One was destroyed at the owner's request when apparently recovering and the other recovered; in the latter tests of the faeces and urine for lead indicated lead poisoning.

DYBING, O. (1947.) Rottegifter, med spesielt hensyn til den betydning de har for veterinærer. [Rat poisons and their importance to veterinarians.]—*Norsk VetTidsskr.* 59. 165-176. 2778

The text of a lecture. Rat poisons mentioned include barium carbonate, thallium sulphate, zinc phosphide, sodium silicofluoride (Na_2SiF_6), antu (alphanaphthyl thiourea), sodium fluoracetate and squill preparations, also the bacterial rodenticide ratin. Norwegian conditions and legislation in this matter are discussed.—J. E.

RADELEFF, R. D. (1948.) **Chlordane poisoning: symptomatology and pathology.**—*Vet. Med.* 43. 342-347. 2779

Chlordane (5,8-endo-dichloromethylene-4,9-dihydro-2,3,5,6,7,8-hexachloro-endane) has been suggested for use as an insecticide on domestic animals. Nine cases are reported of poisoning in goats, sheep, and cows. In acute cases the onset is sudden. Cyanosis immediately precedes death. P.M. examination reveals petechial and larger haemorrhages, characteristically in the intestine and heart, enlargement of the liver, and congestion of brain and spinal cord. The differential diagnosis from D.D.T. poisoning is carefully considered. As there is no direct chemical method for determining chlordane in tissues or body fluids, chlordane poisoning must be diagnosed from the history, symptoms and lesions. The condition will probably be experienced in the field only as the result of carelessness in application of the

insecticide or in its storage, when animals may swallow it accidentally.—W. R. BETT.

KINDRED, J. E. (1949.) **The blood cells and the hemopoietic and other organs of dogs given intravenous injections of 2-chloroethyl vesicants.**—*Arch. Path.* 47. 378-398. [Author's summary copied *verbatim*.] 2780

Daily counts of white and red blood corpuscles and thrombocytes in dogs poisoned with varying amounts of bis(2-chloroethyl) sulfide and the hydrochlorides of ethyl-bis(2-chloroethyl) amine and tris(2-chloroethyl) amine showed significant relations between the neutropenia, lymphopenia, anemia and thrombopenia observed in the peripheral blood and the hypoplasia of cells and inhibition of mitosis observed in the lymph nodes, the spleen and the bone marrow.

Secondary pathologic changes were present in all of these organs, and these are believed to have interfered with the proper functioning of these organs and to have imposed conditions which prevented normal regeneration. In addition, pathologic changes were present in the adrenal glands, small intestine, cecum, colon, liver, pancreas, kidneys and tonsils which are thought to have been caused by the damage done to the capillaries and which contributed to the general conditions of intoxication which occurred in these dogs.

The hemopoietic organs of the dog seem to be more susceptible to the damage caused by the 2-chloroethyl vesicants than are those of the rat.

WHITE, I. G., BLOOD, D. C., & WHITEM, J. H. (1949.) **The toxicity of BAL (British anti-lewisite) for sheep.**—*Aust. vet. J.* 25. 1-7. 2781

The maximum safe dose of B.A.L. as a 5% mixture in 10% benzyl benzoate in peanut oil given intramuscularly to sheep was 60 mg. per kg. body weight administered in four doses at four-hourly intervals. A larger dose was safe when the B.A.L. was mixed with distilled water. Transitory symptoms of toxicity appeared with oral and intravenous dosing. The clinical and P.M. findings of B.A.L. poisoning in sheep are recorded.

WHITE, I. G., BLOOD, D. C., & WHITEM, J. H. (1949.) **BAL (British anti-lewisite) as an antidote to poisoning with sodium arsenite in sheep.**—*Aust. vet. J.* 25. 8-11. 2782

Large doses of B.A.L. given intramuscularly in oil or water, or intravenously and subcutaneously in saline, failed to protect sheep against sodium arsenite administered at the rate of 33 mg. arsenic trioxide per kg. body weight.

STEYN, D. G. (1948.) **The toxicity of various species of eucalyptus trees (Blue gum, "blou-**

gom," "bloekom").—*J. S. Afr. vet. med. Ass.* 19. 25-29. 2783

Drenching two sheep with 40 and 35 kg. of partly decomposed leaves of *Eucalyptus lindleyana* caused no toxic effects; 47 kg. and 37 kg. of freshly picked mature leaves of *E. sideroxylon* dosed to two sheep produced toxic symptoms regarded as characteristic of those produced by eucalyptol, i.e., respiratory and ruminal paralysis, accelerated and weak heart action, intestinal catarrh and fatty degeneration of the liver and kidneys. In four sheep given 45, 31, 56, 56 kg. respectively of the wilted mature and immature leaves of *E. cladocalyx*, typical symptoms of hydrocyanic acid poisoning developed; one animal's condition was reversed by giving sodium thiosulphate intravenously.—R. MARSHALL.

MACCHIAVELLO, A. (1947.) **Cutaneous arachnoidism experimentally produced with the glandular poison of *Loxosceles laeta*.**—*Puerto Rico J. publ. Hlth.* 23. 266-279. In Spanish, pp. 280-293. [Abst. in *Trop. Dis. Bull.* 45. 641. (1948), copied *verbatim*. Signed: H. HAROLD SCOTT.] 2784

Study has been undertaken of the poison or poisons of the spider *Loxosceles laeta* which occurs in Antofagasta, Chile. The lesion produced in man is known as "gangrenous spot." The spider

See also absts. 2745 (lathyrism).

abounds in damp, dark and dirty places, and many were captured in mud and straw huts. Experiments were made with rabbits, rats and white mice at first, but later guineapigs were used solely. The lesions varied in severity from oedema without induration to oedema with induration and to gangrenous spot followed by necrosis and ulceration. In man the same sequence of events occurs, but without general systemic disturbance. The severity differs from one spider to another, and whether the bite (or sting) is the first or not, and whether the insect has been kept caged and fasting. Stings of the black or greyish-black specimens are the worst; they are usually the young ones. The more concentrated the poison (that is, glandular matter ground up and emulsified in saline) the less intense the reaction; this is ascribed to the fact that the concentrated poison causes mass coagulation of the tissues and this impedes diffusion. The glandular poison seems to act only on or in the skin; it is not haemolytic. The arachnolysin extracted from the cephalothorax or abdomen differs in its action from the glandular poison from the stingers and there is no cross-immunity between them. Moreover, the arachnolysin is strongly haemolytic for guineapig erythrocytes and still more for rabbit corpuscles and is not necrotizing.

PHARMACOLOGY AND GENERAL THERAPEUTICS

(For treatment of specific infections see under the appropriate disease)

COHEN, S. M. (1948.) **Accidental intra-arterial injection of drugs.**—*Lancet.* 255. 361-371, 409-416 & 417. 2785

Twelve cases are recorded in which gangrene and loss of limb followed accidental intra-arterial injection of 5-10% solutions of pentothal. These results are thought to be due to a combination of factors, including posture of the arm during injection. A solution of pentothal with high pH results in spasm of the artery and retention of the liquid for a long period. In all cases pain was experienced in the distal arterial tree during injection. Thrombosis was rapid and massive gangrene followed. Similar tragedies have occurred with contrast media in radiography and other therapeutic substances including iodides, sulphapyridine quinine, salvarsan, etc.—G. V. LAUGIER.

HARMS, A. J. (1948.) **The purification of antitoxic plasmas by enzyme treatment and heat denaturation.**—*Biochem. J.* 42. 390-396. 2786

The experimental development is described of a large-scale process for refining horse blood plasmas containing antitoxins, and for concentrating and preparing the refined products for therapeutic use. The method is based on the work

of Pope (1938), the antitoxic plasma being treated with pepsin, which splits the antitoxic molecule into two portions, one of which bears all the antitoxic property of the original, this being followed by critical heat denaturation in the presence of a protein denaturant to precipitate non-antitoxic protein and leave the modified antitoxic protein in solution. Various factors that might influence the yield and degree of purification of the antitoxic protein were investigated.

By this process, it was found possible to refine all true antitoxins, but not antibacterial antibodies. No advantage was obtained in using whole blood, or serum, or salted-out plasma fractions, instead of plasma.—E. COTCHIN.

BUTTERFIELD, C. T. (1948.) **Bactericidal properties of chloramines and free chlorine in water.**—*Publ. Hlth Rep., Wash.* 63. 934-940. 2787

In the disinfection of drinking water after discussing the chemical reactions involved and the experimental results in detail, B. considers that the primary factors for the bactericidal efficiency of both chlorine and chloramine are:—(1) time of contact, the longer the time the more effective the sterilization; (2) temperature, the

lower the temperature the less effective the sterilization; (3) pH, the higher the pH the less effective the sterilization.

Comparing the relative efficiency of free chlorine and chloramine B. states that under the most favourable conditions, a pH of 7.0 and temperature of 20–25°C., 100% kills may be obtained with chloramine residual of about 1.2 p.p.m. in 20 min.; with free chlorine residuals of 0.04 p.p.m. in 1 min.; with the same contact period 25 times as much chloramine as free chlorine is needed; with the same amounts of residual chloramine and free chlorine 100 times the contact period is required for chloramine.—M. W.

DOLL, E. R., WALLACE, M. E., & NEWTON, A. C. (1948.) **Serum level response of horses to procaine penicillin in oil and penicillin in oil and wax.**—*Vet. Med.* 43. 512–517. 2788

At each of three dosage levels, 1,000, 2,000 and 4,000 units per lb. body weight, groups of healthy horses were injected intramuscularly with one dose of procaine penicillin G in sesame oil (eight horses), calcium penicillin in peanut oil and white wax (four horses), potassium penicillin G in peanut oil and white wax (four horses) and sodium penicillin G in peanut oil and white wax (four horses). In each case the injection contained 300,000 units per ml. Blood samples were taken one hour after injection and then at three-hour intervals for 24 hours, and the concentration of penicillin assayed by a serial dilution technique. Results are given in a table.

At a dosage rate of 1,000 units per lb. a measurable serum level persisted for an average of 14 hours in the case of procaine penicillin and for an average of seven hours in the case of the other penicillins.

At a dosage rate of 2,000 units per lb. the corresponding figures were 20 hours and seven hours and at a rate of 4,000 units per lb. the figures were 24 hours and ten hours.

The absorption of penicillin from oil suspensions was most erratic, with great variations in serum levels of different animals at corresponding assay periods. In the case of procaine penicillin in oil the serum level was more uniform in different animals as also was the duration of a detectable serum level.

The authors suggest for clinical use a dosage rate of 2,000 units procaine penicillin G per lb. body weight at 12-hour intervals.

No local tissue reactions were noted with procaine penicillin in oil.—E. J. H. FORD.

YOUNG, M. Y., ANDREWS, G. W. S., & MONTGOMERY, D. M. (1949.) **Procaine penicillin.**—*Lancet.* 256. 863–865. [Authors' summary copied *verbatim*.] 2789

Injections of procaine penicillin, in oil, in water, and in oil incorporated with aluminium stearate, containing 300,000 units per ml. were given to 185 persons.

Procaine penicillin G in oil with aluminium stearate was superior to other preparations tested for delaying absorption of penicillin. It is a stable preparation easy to administer, causes no pain or undesirable side-effects, and in a dose of 300,000 units gave therapeutic blood-penicillin levels for 24 hours in virtually 100% of cases tested.

Tests with oil and water suspensions of procaine penicillin, without aluminium stearate, have shown that with a dose of 600,000 units 100% of cases gave a therapeutic level at the end of 24 hours; with a dose of 300,000 units, however, only 50–60% gave this level.

A few patients received a single dose of 2,000,000 units of procaine penicillin with aluminium stearate in oil, and most had a therapeutic blood-penicillin level for a week after injection.

A preparation of procaine penicillin in oil with aluminium stearate together with soluble penicillin combined the advantages of rapid initial absorption followed by delayed action.

Procaine penicillin G in oil with aluminium stearate is the most suitable preparation for clinical use where economy in material, slow absorption, and a long-lasting therapeutic blood-penicillin level is important.

GEORGE, M., & PANDALI, K. M. (1949.) **Sensitisation of penicillin-resistant pathogens.**—*Lancet.* 256. 955–957. [Authors' summary copied *verbatim*.] 2790

The growing of penicillin-sensitive and penicillin-resistant organisms together may cause the penicillin-resistant organisms to become penicillin-sensitive.

Growth together for half an hour at 37°C is in some cases sufficient to induce such sensitivity.

The acquired sensitivity lasts a fairly long time.

Our earlier postulate that complex catalytic systems are present in pathogens and responsible for either sensitivity or resistance to penicillin is supported by the results of experiments reported here.

The factor responsible for the sensitivity to penicillin is a very labile constituent of the bacterial cell, and appears to be ribonucleic acid.

MOORE, L. A., & SYKES, J. F. (1947.) **Thyroprotein for cows.**—*Yearb. U.S. Dep. Agric.*, 1943–47. pp. 107–112. 2791

The more important aspects of thyroprotein are briefly reviewed. The drug is also known as iodinated casein, iodinated protein, thyrocasein,

thyrolactic thyroprotein and under the trade name protamone.

It is best to feed thyroprotein to cows in the declining stage of lactation, and it will evoke greater milk yield responses from high yielding cows than from poor producers.

Cows fed standard rations while thyroprotein is given will lose weight, but this may be corrected by giving 20 % additional food.

Long-term experiments on the health of treated animals are desirable, but the opinion is given that if the health of treated animals is unimpaired, thyroprotein could be quite useful for increasing milk and fat production in commercial herds.—G. L. BAILEY.

ZUNDL, J. (1945.) Phenothiazin: Wirkung, unter besonderer Berücksichtigung etwaiger Schädigungen (1945). [Action of phenothiazine, especially its possible deleterious effects.] —*Inaug. Diss., Vienna*. [Abst. in *Wien. tierärztl. Mschr.* 34. 345. (1947).] 2792

The action of phenothiazine on nine horses, one mule and two dogs was investigated. In horses, phenothiazine was extremely effective against strongyles so that their eggs were no longer to be seen in the faeces after the third to sixth day after treatment. P.M. examination of two horses showed that the strongyle worms had been killed. The drug was inactive against *Oxyuris*, *Ascaris* and *Strongyloides* spp.

Horses given repeated full doses of phenothiazine became affected with subclinical anaemia. Five daily doses of 10 g. were effective and completely non-toxic, and did not reduce the R.B.C. count.

The two dogs used tolerated doses of 1–25 g., and only in one which was unwell for one day after dosing was there a change in the blood

See also absts. 2628 (tuberculosis); 2639 (glanders); 2641 (swine erysipelas); 2644 (*Pseudomonas* infection); 2652 (leptospirosis); 2657 (dourine); 2661 (trichomoniasis); 2663, 2665–2667 (coccidiosis); 2686 (equine encephalomyelitis); 2709 (rickettsiasis); 2733–2734 (anthelmintics); 2837 (textbook).

PHYSIOLOGY, ANATOMY AND BIOCHEMISTRY

KELLGREN, J. H. (1949.) Deep pain sensibility. —*Lancet*. 256. 948–949. [Author's conclusions copied *verbatim*.] 2795

Deep pain sensibility has certain attributes, such as characteristic quality, frequent false localisation, associated muscle spasm, and susceptibility to cooling which distinguish it clearly from cutaneous pain.

Deep and cutaneous pain sensibility may also be dissociated; hence it is probable that they are mediated by different types of nerve-fibre.

The clinical syndromes produced by disturbances of deep and cutaneous pain sensibility may differ markedly, and what is true of cutaneous pain is not necessarily true of deep pain. In all clinical and experimental work it would therefore

picture (many polychromatic normoblasts, erythrocytes and Jolly bodies).—J. E.

EIDE, P. M., DEONIER, C. C., & NOTTINGHAM, E. (1946.) Quick-breaking fuel-oil emulsions containing DDT.—*Mosquito News*. 6. 17–19. [Abst. in *Exp. Sta. Rec.* 95. 358. (1946), copied *verbatim*.] 2793

Use of 2-percent of an emulsifier containing 5 percent of DDT in No. 2 fuel oil permitted addition of water from mosquito breeding places, thus making it possible to obtain the quantity of spray necessary for thorough distribution of the low dosages of DDT with available equipment. Any emulsifier may be used which will form good emulsions with fuel oil; the emulsion concentrates may be used to form quick-breaking emulsions by diluting 1 part concentrate to 4 parts fuel oil.

BARKER, G. E. (1948.) Non-ionic detergents.—*Soap & Sanit. Chem.* 24. No. 6. 46–48; 65. 2794

Non-ionic detergents are those products which do not ionise in solution and are the most recent to find application in commerce. The hydrophilic portion of the molecule is a polyoxyethylene derivative, while the lipophylic portion may be derived from a wide variety of chemical compounds including fatty acids, alcohols, thioalcohols and alkylphenols.

The non-ionic detergents possess certain outstanding properties in that they are compatible with water of any hardness and with sea water and also increase the effective germicidal properties of some of the quaternary ammonium compounds. They do not irritate human skin and do not de-fat it to as great an extent as other types of synthetic surface active agents.—W. MOORE.

be wise to distinguish between these two main types and to make a further distinction between immediate and delayed skin pain.

To avoid confusion we should define our vocabulary of pain with the utmost care, so that our records may be translated back into sensory experience and become intelligible to other workers in this field.

We still know surprisingly little about pain sensibility and particularly about the genesis of pain in disease, and we should therefore avoid constructing those fascinating diagrams of unorthodox pain pathways and pain mechanisms whose intellectual neatness and completeness belie the facts and discourage further inquiry.

Though much useful information is being

gained from anatomical studies of the pain receptors and from electrical studies of action potentials and cerebral activities, the facts most directly relevant to the problems of pain concern the sensory experience itself, and there is still a wide field for both clinical and experimental work at this level.

STRAUSS, J., Jr., & NECHELES, H. (1948.) **Variations in dermal absorption with age.**—*J. Lab. clin. Med.* 33. 612-617. 2796

Definite variations have been demonstrated in the rate or pattern of absorption of intradermally injected Evans blue, the variation being related chiefly to the age of the subject rather than to specific diseases. In the young the initial wheal was smaller than in older people, but the dye remained longer in the skin of the young. The size of the wheal increased in the young before disappearing; in older persons it decreased steadily. These results are not readily explained. They may partly be due to differences in texture of the skin between the young and the old.

—W. R. BETT.

POPPER, H. (1949.) **Significance of agonal changes in the human liver.**—*Arch. Path.* 46. 132-144. [Author's summary copied *verbatim.*] 2797

A general comparison of the histologic appearances of the liver in biopsy and autopsy specimens reveals, in addition to cytoplasmic differences—caused primarily by the absence of glycogen from autopsy specimens—that the perisinusoidal tissue spaces are usually closed in biopsy specimens and open in autopsy specimens. Open spaces are associated with an extended reticulum framework such that the cross fibers of the latter are better visualized.

A comparison of a biopsy specimen taken from a liver a few hours before death and an autopsy specimen of the same liver shows that striking dissociation of the liver cell cords may occur in the agonal period. Since this is rarely seen in biopsy specimens, even in cases of severe damage of the liver, regurgitation jaundice cannot be explained by communications between bile capillaries and perisinusoidal spaces which are the result of this dissociation. Whereas in livers of persons dying instantaneously the tissue spaces are obliterated, they may be wide open after an agonal period of longer than 10 minutes—for instance, if sudden death results from suffocation, strangulation or heart failure. This observation speaks against the clinical significance of the hepatic edema of serous hepatitis seen in autopsy specimens, the more so since it is usually absent from biopsy specimens, even in the presence of severe damage of the liver.

The condition of the tissue spaces may be

helpful in estimating the duration of the agonal period in cases of sudden death.

DuBOIS, E. F. (1949.) **Why are temperatures over 106°F. rare?**—*Amer. J. med. Sci.* 217. 361-368. [Author's summary slightly modified.] 2798

A survey has been made of 1761 temperature readings in 357 patients suffering from diseases characterized by high fever. Only 4.3% of the temperatures were above 102°F. None was above 107.8°F.

In these particular fevers 608 readings came between 104° and 105°F. Less than half as many fell between 102° and 103°F. These are indications that in these fevers the "thermostat level" for the temperature regulating mechanism was set in the neighbourhood of 104° to 105°F.

Human temperatures much higher than 106°F. can be found in several conditions other than infectious diseases. The normal temperature regulating mechanism may be overwhelmed suddenly by a fever cabinet or gradually by heat stroke with its exhaustion of the sweat glands. The mechanism together with the peripheral circulation often fails in moribund patients.

Except for these anomalous conditions temperatures are kept safely below the danger level by an "emergency regulatory mechanism in fever" which acts chiefly through the peripheral circulation and the sweat glands.

OPSAHL, J. C. (1949.) **Elevated environmental temperature: its possible influence on the action of spreading factor.**—*Yale J. Biol. Med.* 21. 433-436. [Author's conclusions copied *verbatim.*] 2799

During periods of exposure to increased environmental temperatures, there was observed in mice a decrease in the degree of intradermal spreading of India ink with or without hyaluronidase. This inhibition appeared to be comparable to that seen following treatment with adrenal cortical extract. These findings are reported as suggestive, rather than conclusive, that increased environmental temperatures and humidity may play a role in stimulating the adrenals and thus cause decrease of the permeability of the ground substance.

MAYER, J. (1949.) **Gross efficiency of growth of the rat as a simple mathematical function of time.**—*Yale J. Biol. Med.* 21. 415-419. [Author's summary copied *verbatim.*] 2800

The gross efficiency of conversion of food to body weight in the rat fits excellently a simple logarithmic function. The value obtained for this efficiency at weaning affords an additional confirmation of Kleiber's law.

KEKWICK, R. A. (1948.) **Some newer knowledge**

of plasma proteins.—*Brit. med. Bull.* 5. 342-345. 2801

A brief review is given of recent work on the application of the ultracentrifuge, the electrophoretic analysis of normal and pathological plasmas and antisera, the bulk fractionation of human plasma-proteins with solvents, and the clinical application of plasma-fractionation products.—J. R. PICKFORD.

DAVIES, C. N. (1946.) Filtration of droplets in the nose of the rabbit.—*Proc. roy. Soc. Ser. B.* 133. 282-299. [Author's summary copied verbatim.] 2802

Airborne droplets or nearly spherical particles down to a diameter of about 7μ will be filtered out in the nose of a rabbit. Those from 1.5μ down to about 0.005μ , which corresponds to a single molecule of molecular weight of the order of 10,000, will pass freely into the lungs. Molecules of molecular weight below about 500 will be effectively filtered out in the nose unless accumulation in the tissues near the surface becomes a controlling factor. The filtering unit, which also provides most of the resistance to air-flow comprises the maxillary turbinates.

VENGE, O. (1948.) Pelsdyrenes Seksualfysiologi. [Sex physiology of fur animals.]—*Maanedsskr. Dyrlaeg.* 59. 305-328 & 329-341. 2803

In a lecture the sexual physiology of foxes, mink and nutria is described.

Foxes have a strictly limited season of sexual activity occurring between December and March. The pro-oestrus lasts for 30-40 days and oestrus for 3-7 days, during which at least two matings normally take place. The gestation period is about 52 days and the average litter size is five. Particulars are given of the appearance of the sexual organs of foxes of both sexes during the fertility period. Foxes are normally monogamous, but in fur farm conditions the majority of males can be trained to become polygamous so that one male can serve two or three vixens.

Mink also have a restricted breeding season. The period of oestrus is 8-9 days and ovulation does not occur in absence of mating. The gestation period is about 50 days and the average litter size 4-5. Repeated mating is necessary for good-sized litters.

Statistics are quoted on such factors as age of females and day of oestrus when mated as influencing litter sizes in foxes and mink and some experiences, generally unfavourable, on hormone therapy are quoted.

See also absts. 2831 (milking of cows); 2836 (textbook); 2839 (neurology of the horse).

Nutria are polyoestral and usually breed twice a year. The period of oestrus is 2-3 days and that of gestation 140 days. The 4-5 young are remarkably far developed at birth.—J. E.

EVERETT, J. W. (1945.) The microscopically demonstrable lipids of cyclic corpora lutea in the rat.—*Amer. J. Anat.* 77. 293-323. 2804

The lipids were demonstrated mainly by histochemical techniques such as Sudan staining, the Schultz "cholesterol" test and the digitonin reaction. E. describes these techniques in detail and critically reviews the nature and validity of the results.

Two strains of rats were used, a normal inbred strain with 4-5 day oestrous cycles and the DA strain, which has spontaneous persistent oestrus after the first four or five months of life, although before this time regular oestrous cycles occur.

In normal rats demonstrable fat in the corpora lutea continues to increase in amount during di-oestrus but at the pro-oestrus stage a regression occurs followed by a re-appearance of abundant quantities of lipid. During pro-oestrus, when there is a regression in visible fat in healthy parenchyma, patches of fatty necrosis make their appearance.

In naturally cyclic DA rats the corpora lutea are deficient in lipid, especially in cholesterol, after mid-oestrus. No further reduction in the visible fat occurs during pro-oestrus and extensive areas of fat necrosis are absent. In DA rats with persistent oestrus an experimental cycle was induced by the injection of progesterone and the corpora lutea were deficient in lipids as in the naturally cyclic DA rats. When the persistent oestrus of DA rats was broken by injections of progesterone and prolactin there was an accumulation of lipid in the corpora lutea as in normal rats.

The increase in lipid may be due to an accumulation of cholesterol and its esters. E. concluded that the marked deposition of cholesterol in the next youngest set of corpora lutea indicates some luteotropic stimulation during the preceding days. The areas of fat necrosis may also result from this stimulus.

The reason for the diminution of lipids during the pro-oestrus phase of the cycle is obscure but E. considers that since during this stage the secretion of progesterone occurs then cholesterol may possibly be the precursor of progesterone.—F. R. BELL.

brief survey of the position during recent years.—*Brit. med. Bull.* 5. 192-195. 2805

PUBLIC HEALTH, VETERINARY SERVICES AND VETERINARY EDUCATION

SMITH, J. (1947.) Lactation: function and product. Milk-borne disease in Britain. A

In his survey of the milk-borne diseases in Britain, S. specifically mentions seven conditions:—Bovine tuberculosis; typhoid and para-typhoid fevers; salmonella food poisoning infections; dysentery; undulant fever; streptococcal infections and staphylococcal food poisoning.

TB. is still looked upon as the most serious milk-borne infection. The report of the Committee of the Medical Research Council (1942) on Tuberculosis in War-time reiterates the statement that at least 40% of the cattle in Great Britain give a positive reaction to the tuberculin test, although the percentage varies in different districts, and calls attention to the fact that at least 6% of farm milk samples contain tubercle bacilli.

Tables are given showing the probable mode of infection in 48 human cases of pulmonary infection with bovine type tubercle bacilli and also the death rate from abdominal TB. per million of children under five years of age. Pasteurization of ordinary milk supplies is recommended and it is emphasized that in London, where in 1938 98% of milk supplies were pasteurized, the death rate from abdominal TB. was only one-tenth that of rural areas.

Advances in methods of phage-typing of both *Salmonella typhi* and *S. paratyphi* have been of great assistance in tracing the source of infection of many of the sporadic and small groups of salmonella infections. Two extensive outbreaks are mentioned as being due to infection by icecream.

Owing to the war period there was a high prevalence of bacillary dysentery infection amongst the general population, the most frequent being due to *Shigella sonnei*, one outbreak being mentioned as involving 43 out of 72 persons consuming milk from a small farm. Another involved 120 individuals consuming milk from a retail dairy.

Discussing undulant fever, it is remarked that despite the fact that a fair percentage of milk contains *Brucella abortus*, the incidence of human infection is very low.

There is little doubt that when a milk-borne epidemic of scarlet fever or streptococcal sore throat occurs, the milk must have been contaminated as the result of a streptococcal mastitis, the infection having been transmitted to the cow from human sources.

Outbreaks of staphylococcal food poisoning occur, but they are much more common in the U.S.A. than in Great Britain.

S. concludes by saying that pasteurization could solve the trouble of milk-borne disease but admits the difficulties in rural areas. A further need is the provision of a more complete veterinary service which would provide for a complete survey of the diseases of cattle and then these could be tackled in a systematic manner.—D. S. R.

COOK, G. T., & DE COSTOBADIE, L. P. (1947.) Food poisoning associated with infected dried egg.—*Mon. Bull. Minist. Hlth publ. Hlth Lab. Serv.* 6. 177–180. 2806

A short account of an outbreak of *S. typhimurium* infection involving 43 persons. Organisms of the same Vi-phage type were isolated from 11 cases and from a sample of dried egg. Sponge cake made from the infected egg was not the means of transmitting the infection which was attributed to the cream, made for a trifle, which had been mixed in the same machine as that used for the sponge cake mixture.—M. WOODBINE.

HJÄRRE, A. (1944.) Statens Veterinärmedicinska Anstalt. Kortfattad redogörelse för dess tillkomst, organisation, verksamhet och nybyggnader. [The Swedish State Institute of Veterinary Medicine. Brief account of its origin, organisation, activities and new buildings.] pp. 42. Stockholm: in *Medd. vet.-med. Anst. Stockh.* (1944.) 2807

A detailed history of the Swedish State Institute of Veterinary Medicine written by its Director, from its modest beginnings in 1911 as an offshoot of the Veterinary College which was then known as The Veterinary Institute, to 1944 when its reorganization as a separate entity had been completed.

In 1911 the Institute was run as a single department under a director with the standing of a University professor and a staff of four consisting of one demonstrator, who was at the same time responsible for the teaching of bacteriology at the Veterinary College, one technical assistant, one clerical assistant and a caretaker. In 1915 the Royal assent was given for established status for the Institute, as the work had nearly doubled. During the first nine years the small staff had had to tackle tasks of widely different kinds and properly organized division of the work had not been possible. After 1920, however, the work became increasingly specialized and decentralized as the scope of the various aspects of veterinary research widened, until in 1939 the Institute consisted of four departments: diagnostic, serological, tuberculosis and contagious abortion laboratories, of which only one, the diagnostic department which covered bacteriological examinations, pathological anatomy and chemical and parasitological examinations, remained under the direct supervision of the director. It was then decided to reorganize.

In the final plan five main divisions: Bacteriological, Pathological Anatomical, Serological, Parasitological and Chemical were formed; there were two consultants for diseases of pigs, poultry and animals bred for furs and a central registrar's office.

The bacteriological department was subdivided into five sections: general bacteriological diagnosis; bacteriological, water and meat control and examination of suspect foodstuffs; diagnosis of TB.; diagnosis of mastitis; and a separate laboratory for tuberculin preparation. The serological department was divided into two sub-sections, the serum and the serodiagnosis departments. In the first about 20 different protective sera are prepared and tested, also diagnostic sera, standard and autogenous vaccines, anatoxins and immune sera.

A special serodiagnostic laboratory, mainly for bovine contagious abortion, also deals with glanders, *Salmonella abortus* infection in mares, salmonella infections of poultry and pregnancy diagnosis in mares.

The chemical laboratory is responsible for the preparation of all culture media and other routine preparations. This department deals also with the cleaning and sterilization of apparatus and storage and supply of glass apparatus and chemicals for the whole Institute.

The two consultants, one for diseases of pigs and the other for diseases of poultry and of animals bred for furs, are intended to be links between the Institute and animal owners and are responsible both for control of the more serious outbreaks of infectious diseases and for an information and propaganda service with the object of health improvement among stock.

A very generous sum of money was granted by the Government for the building and equipment of the new Institute on an extensive parkland site which covers an area of 75,000 sq. m. (18.5 acres) wooded with hundred-year-old oaks which have been left standing, being protected by Swedish

See also absts. 2681-2684 ("Q" fever and milk).

law. The building took two years and was completed in April, 1944. The ten buildings are nearly all connected with each other and they have a total cubic capacity of over 40,000 cu.m. The building costs amounted to 4,425,000 kr. (£305,805) with an additional cost of 781,900 kr. (£54,035) for equipment, apparatus and furnishing.

In 1911 the diagnostic examinations made totalled 195 and in 1924 the total was 4,517; general bacteriological examinations rose from 1,728 in 1925 to 24,815; TB. examinations from 3,105 to 10,534; P.M. examinations from 304 to 5,771; parasitological examinations from 42 to 5,108 and chemical analyses from 9 to 1,761. Serodiagnostic examinations, begun in 1916, rose from 438 to 233,522. Serum preparation increased from 32,470 ml. in 1914 to 2,123,570 ml. in 1943-44. A vaccine preparation total in 1920 of 451 ml. increased to 1,316,083 ml. and tuberculin from 43,000 ml. in 1912 to 99,288 ml. in 1943-44.

—F. E. W.

KOVALENKO, Y. R. (1946.) [Fifteen years' work of the State Institute for the Scientific Control of Veterinary Preparations.] — *Veterinariya, Moscow*. No. 1. pp. 7-10. 2808

The State Institute, Russia, was founded in 1931 and its development is described. Its main functions are the preparation, control and standardization of veterinary preparations. New products and new methods have been developed, but only a generalized statement of their range is given, with no details. A very brief reference is made, however, to what is spoken of as an anti-haematozoic preparation described as "novoplasmin LP₄" (Shmulevich, 1944). [No details given and town not stated.] A photograph of the building is given.—J. JONAS.

LIVESTOCK HYGIENE

CAROLLO, J. A. (1945.) The removal of DDT from water supplies.—*J. Amer. Wat. Wks. Ass.* 37. 1310-1317. [Abst. in *Exp. Sta. Rec.* 95. 224. (1946), copied *verbatim*.] 2809

DDT applied to any water gradually loses its ability to kill the yellow-fever mosquito; 0.0015 p. p. m. became ineffective in 48 hr. and 0.1 p. p. m. in 10 to 12 days. Turbidity in the water had little effect on the 48-hr. kill of mosquito larvae by DDT, but on settling out removed some of the DDT held in suspension. The normal concentrations of DDT used in mosquito larvicide

work did not induce toxic effects in warm-blooded animals drinking water so treated. Any of the conventional water treatment processes involving coagulation, sedimentation, and filtration removed 80 to 98 percent of DDT in a water supply originally containing 0.1 to 10 p. p. m. Complete removal (to less than 0.001 p. p. m.) of DDT from a water supply is said to be possible if intimate contact with activated carbon is provided for 15 min. after coagulation and sedimentation, but before filtration.

REPRODUCTION AND REPRODUCTIVE DISORDERS

ANDERSON, J. (1949.) Artificial insemination in cattle breeding in Kenya.—*E. Afr. agric. J.* 14. 148-150. 2810

Experience with artificial insemination in Kenya has shown the need for fundamental research into the physiology and pathology of

reproduction, the influence of environment on reproduction, and also bull psychology with particular reference to sexual lethargy of the Zebu bull.

There is great scope for genetical research especially into the correlation between the estimated and actual breeding values of sires and into the influence on the genetic composition of succeeding generations brought about by the decrease in the fraction of all males born that are used as sires.—E. J. H. FORD.

BRIÈRE, M. J. (1949.) Nouvelle technique de récolte du sperme chez le taureau pour l'insémination artificielle. [A new method for collection of bull semen.]—*Bull. Acad. vét. Fr.* 22. 195–196. 2811

B. describes a method of obtaining semen from bulls which refuse service to artificial vaginas of conventional design. His new artificial vagina consists of a stiff rubber cylinder, 35 × 6.5 cm., with a thin rubber liner. Warm water is poured into the water-jacket at one end before the liner is bound into place. For use, the instrument is inserted as far as possible into the vagina of a pluriparous cow so that the posterior end of the artificial vagina is 4–5 cm. within the vestibule. The bull is then allowed to serve naturally, the semen being collected in a collecting tube previously attached to the cervical end of the artificial vagina by a rubber cone (without the conventional "air hole"). A metal collar around the posterior end of the artificial vagina keeps the instrument centrally aligned and prevents the penis passing alongside. Immediately after ejaculation the artificial vagina is removed, the collection tube changed, and a second collection made. B. claims to have made bi-weekly collections for six months from a bull which would not serve the usual artificial vaginas.—R. J. F.

MANN, T. (1948.) Fructose content and fructolysis in semen. Practical application in the evaluation of semen quality.—*J. agric. Sci.* 38. 823–831. 2812

A simple method is described whereby the fructose content and fructolysis in small samples of semen can be measured in laboratories working under field conditions. The content of fructose in fresh semen depends on the secretory function of the accessory glands. Conspicuously low levels of fructose in semen are abnormal and may be associated with other symptoms of hormonal dysfunction and semen of poor quality. A high fructose content is usually, but not always, indicative of high sperm density and high motility. The rate of fructose disappearance in incubated semen forms a convenient measure of spermatozoa fructolysis and the results can be expressed in

terms of a quotient—"fructolysis index," i.e., mg. fructose utilized by 10^9 spermatozoa in one hour at 37°C. The index for normal bull semen is 1.4–2.0. It is believed that an assay of fructolysis in semen furnishes a useful method for the evaluation of the quality of the semen.—A. T. C.

STENGEL, C. H. (1949.) Early diagnosis of pregnancy in the mare.—*J. Amer. vet. med. Ass.* 114. 67. 2813

In pregnant mares, impression smears made from the cervix have thick white mucus with a glossy surface, while the microscopic examinations of the mucus reveal large numbers of mucous and desquamated epithelial cells. Smears from non-pregnant mares are thin and almost transparent and contain relatively few cells. It is claimed that pregnancy can be diagnosed correctly in about 90% of cases when this test is applied 15 days after service. [This would appear to be a modification of the Kurosawa test.]—ALFRED T. COWIE.

TABARELLI NETO, J. F. (1949.) The reaction of the male toad to pregnant mare's serum and its comparative study with the Cole-Hart test.—*Amer. J. vet. Res.* 10. 74–76. 2814

Male toads of the species *Bufo marinus* and *Bufo paracnemis*, were used as test animals. A single injection of 9–20 ml. serum was made into the lateral lymph sac. If the serum was from a pregnant mare, spermatozoa were present in the urine removed from the cloaca within one and a quarter to five and a quarter hours of the injection. Thirty-nine tests were carried out in mares 36–111 days following service. In 36 of these (25 positive and 11 negative) the results agreed with those given by concurrent Cole-Hart tests on rabbits. Of the three discordant results, two were positive to both tests on retesting at a later period. It is concluded that while the results are encouraging, further study of the test is required before it can be adopted as a routine test for pregnancy in the mare.—ALFRED T. COWIE.

CHENG, P., & CASIDA, L. E. (1949.) Effects of testosterone propionate upon sexual libido and the production of semen and sperm in the rabbit.—*Endocrinology.* 44. 38–48. 2815

The effect of testosterone propionate upon the reproductive performance of adult male rabbits was studied in two experiments. In the first experiment, run during July to September, 1947, 12 rabbits were used and testosterone propionate was given subcutaneously in doses of 1, 3 and 10 mg. per day for 20–32 days. In the second experiment, run during February to March, 1948, eight rabbits were used and doses of 0.5, 3 and 20 mg. were given. In both experiments there was an increase in the sexual activity as indicated by a decrease in the average interval

required to obtain an attempt at ejaculation and by an increase in the number of attempts. No consistent effect was noted on the volume of the fluid portion of the semen, but the transparent jelly-like fraction was increased in both experiments. During treatments the number of spermatozoa per ejaculate was slightly decreased, but the total number during the treatment period was maintained, in part by virtue of the greater number of ejaculates. The motility of the spermatozoa in different dilutions was studied in the first experiment. It appeared to improve in successive dilutions during the treatment period. Post-treatment effects were not consistent in the two experiments, and it is believed that the effects of frequency of use and environmental temperature required further study.—ALFRED T. COWIE.

LAING, J. A. (1949.) **Infertility in cattle associated with death of ova at early stages after fertilisation.**—*J. comp. Path.* 59. 97–108. 2816

Two groups each of 24 maiden heifers, kept under constant conditions of husbandry, were mated in such a way that the probable fate of the ova could be followed. In principle the experiment consisted of (a) proving that fertilization probably occurred and (b) proving that some fertilized ova died. The evidence for (a) was largely circumstantial and consisted of providing all the known prerequisites for fertilization, and subsequently demonstrating that the majority of the animals had conceived. Those which did not become pregnant were presumed to have fertilized ova which subsequently died.

The optimal circumstances for fertilization are discussed in detail. The onset and cessation of oestrus were measured by an acceptance test every eight hours throughout the experiment. Natural service was permitted at the time of acceptance and in addition an adequate dose of proven semen was inseminated *post oestrus* to ensure that viable spermatozoa were present at the time of ovulation. Examination of the ovaries *per rectum* at 20–25 hours *post oestrus* and subsequently gave an indication of the probability of ovulation having occurred within the life-span of the spermatozoa. Results after first service:—17 full-term pregnancies ensued and a further nine were demonstrated at slaughter at about 25 days *post oestrus*. From each of six heifers slaughtered at 40–60 hours, fertilized ova were recovered from the fallopian tubes. From one heifer slaughtered at 24 days degenerating foetal tissue (trophoblast) was recovered, and in two others there were signs of pregnancy (corpora lutea enlarged, cervical seals, uterine changes), but no foetal tissue was found. These three cases illustrate death of fertilized ova. The other heifers returned to oestrus at abnormally long periods (29, 39 and 39

days) and L. considers that in these similar ovarian death occurred. One of these heifers (39 d.) became pregnant at second service, but the others remained infertile. Nine other heifers returned from first service at normal interval, and L. suggests early ovarian mortality in these. Of these nine after second service, six were found to have fertilized ova when slaughtered at 40–60 hours and the remaining three had normal pregnancies. [The one remaining animal was not used since it never had signs of oestrus.] L. discusses the validity of the circumstantial evidence and concludes that 30% of fertile ova may degenerate and he suggests reasons for this. The results are not presented statistically. [There appears to be a mistake on page 104 in the reference numbers of heifers returning to service since they differ from those on pages 101 and 102 and in Table III. This error is confusing.]—R. J. FITZPATRICK.

GREEN, W. W. (1947.) **Duration of sperm fertility in the ewe.**—*Amer. J. vet. Res.* 8. 299–300. 2817

This investigation was undertaken to provide data for the hand mating of sheep because of the variability in the duration of oestrus in the ewe.

Fifty-five grade Shropshire ewes and two highly fertile grade Shropshire rams were used. The ewes were teased at 6 a.m., 12 noon, 5 p.m. and 9 p.m. every day by aproned rams and the duration of two oestral periods was found for each ewe before allowing true mating. The end of oestrus was ascertained by teasing and mating was permitted at various times before the estimated end of oestrus. Pregnancy was determined either by allowing sufficient time to elapse to give each ewe an opportunity to return to oestrus or, if there was no return, by examination of the uterus for foetuses on slaughter.

It was found that spermatozoa can remain in the reproductive tract for at least two days and remain fertile. It is concluded that for most ewes it is only necessary to mate once during an oestral period of normal length provided the semen is of high quality and the service normal and vigorous.

—F. R. BELL.

YEATES, N. T. M. (1949.) **The breeding season of the sheep with particular reference to its modification by artificial means using light.**—*J. agric. Sci.* 39. 1–43. 2818

By exposing 15 ewes and two rams to lengthening periods of light, while a similar group was exposed to diminishing photoperiods, Y. obtained results which justify his conclusion that "the natural sexual season may be modified and even reversed at will by suitable alteration of the daily light ration." Onset of the sexual season follows exposure to decreasing photoperiods, and lengthening days cause cessation of oestral cycles. By

reversal of the light seasons (producing long periods of light during winter, and short periods during summer) the usual summer decline in libido and semen quality in rams may be replaced by high fertility at this time.

A very extensive bibliography is included, and the discussion and experimental methods are well worth study by those interested in sheep.

—G. B. S. HEATH.

EVANS, I. A., & EVANS, W. C. (1949.) **Effect of young grass in the diet on the onset of sexual maturity in mice.** [Correspondence.]—*Nature, Lond.* 163. 908-909. 2819

Three groups each of 12 young female mice received a nutritionally adequate synthetic basal diet supplemented in one group with fresh grass and in another with dried grass. There was no appreciable difference in the growth of the three groups over 45 days, but sexual maturity, as indicated by the opening of the vagina, was reached much quicker in the two groups receiving a grass supplement than in the group on basal diet alone.—J. R. PICKFORD.

TENDEIRO, J. (1947.) **Novilho com ausência congénita da cauda. [A steer with congenital absence of the tail.]**—*Rev. Med. vet., Lisboa.* 42. No. 920. 105-112. 2820

T. briefly describes a case which he found in Portuguese Guinea.

The hypothesis of achondroplasia was not accepted as it did not agree with the good body proportions of the animal.

Achondroplasia is briefly reviewed.—F. A. E.

ISAKSSON, A. (1948.) **Genuin epilepsi hos nötkreatur. [Genuine epilepsy in cattle.]**—*Skand. VetTidskr.* 33. 1-27. [English summary.] 2821

The author examined a cow which during one year had numerous tonic-clonic spasms, accompanied by unconsciousness, bradycardia and exophthalmus. The clinical cause of these symptoms could not be established. The spasms resembled attacks which can be produced by cardiazol.

The sire and six of the 13 offspring of this cow were slaughtered because of spasms and bradycardia. P.M., all investigated animals appeared to be normal.

The author believes that bradycardia and exophthalmus were inherited and linked with the epileptic disposition.—E. G.

GILLMAN, J., GILBERT, C., & GILLMAN, T. (1948.) **A preliminary report on hydrocephalus, spina bifida and other congenital anomalies in the rat produced by trypan blue.** The significance of these results in the interpretation of congenital malformations following maternal rubella.—

S. Afr. J. med. Sci. 13. 47-90. [Abst. in *Nutr. Abstr. Rev.* 18. 840. (1949), slightly amended.] Signed: I. LEITCH.] 2822

Injection of trypan blue into rats before and during pregnancy causes malformations in a proportion of the young subsequently born. The diet was the stock diet of wheatmeal 50, dried skimmed milk 21, yeast 3, salts (Steenbock 40) 22 oils and lard 10, maize meal 14 per cent., and cooked ox liver 2 oz. per lb. dry weight of food. Of the 100 females given trypan blue, 11 produced no litter and 89 bore 118 litters of which 58, with 352 young, appeared to be normal. In the remaining 60 litters with 345 young, 134 of the young were malformed, with a total of 199 obvious defects. The most common were hydrocephalus, *spina bifida*, shortening or absence of the tail, and eye defects such as bilateral cataract and absence of the eye. All the deformities were clearly due to disturbances of development: some of them recall the defects which occur in acute deficiency of vitamin A or of riboflavin. A full account is given of the time sequence of injections and defects produced. Sometimes the embryos were absorbed *in utero*. Severe metabolic disturbances associated with gross tissue changes occurred in the mother. These will be described later.

The significance of these disturbances of foetal development is discussed in relation to those which occur in human infants born to mothers who have had a rubella infection in early pregnancy.

CASTLE, W. E. (1948.) **A.B.C. of colour inheritance in horses.**—*Genetics.* 33. 22-35. 2823

C. postulates three basic colour genes for horses:—the colour-pattern gene (A) as seen in the wild Prejvalski horse; (B), the gene for blackness in animals which possess the dominant gene for colour (C). Mutation of (A) to (a) produces a recessive black and if at the same time there is mutation of (B) to (b), a uniform brown appears. The mutation of gene (C) to the recessive allele in other mammals produces when completely homozygous, the true albino. C. states that no true albino mutation of the colour gene occurs in horses.

A description is given of the colours recorded in stud books and an attempt is made to correlate them with the genetic constitution of sire and dam.

Certain other genes which modify the basic colour combinations are described.—J. G. O'SE.

BONNIER, G. (1946.) **Studies on monozygous cattle twins. I. General introduction. II. Frequency of monozygous twins.**—*Acta Agric. Suecana.* 1. 139-146; 147-151. 2824

I. This is a general description of the study started in 1937, of monozygous twin calves which

was designed to permit of an evaluation of the effects of environmental conditions on growth and milk yield. Up to the end of 1944, the number of monozygous twin pairs which had been studied was 34. The tests used to determine monozygosity are described, the main tests being the distribution and conformation of hair whorls and the characters of the nose prints. Since 1944 the determination of blood groups has been used as an additional test.

The methods of management, feeding and measurements of growth are described.

II. Describes and discusses a mathematical formula for estimating the frequency of monozygous twin births in cattle.—M. C.

HANSSON, A. (1946.) **Studies on monozygous cattle twins. III. The effect of udder destruction on milk secretion.**—*Acta Agric. Suecana*. 1. 153-162. [Abst. in *Brit. Abstr.* AIII. Nov. p. 1155. (1948), copied *verbatim*. Signed: G. HORNER. 2825

III. An injury to the left posterior quarter of the udder of one of a pair of monozygous twin dairy heifers led to the cessation of milk secretion in that quarter. As compared with the normal twin, milk yield was decreased in the left anterior quarter of the udder, but increased slightly in the right-hand quarters. The abnormal twin yielded milk containing less fat and more lactose than did the uninjured twin.

HANSSON, A. (1946.) **Studies on monozygous cattle twins. IV. Twin studies on the predisposition for diseases.**—*Acta Agric. Suecana*. 1. 163-169. 2826

BONNIER, G., & HANSSON, A. (1946.) **Studies on monozygous cattle twins. V. The effect of different plans of nutrition on growth and body development of dairy heifers.**—*Ibid.* 171-205. 2827

ZOOTECNY

FROST, J. N. (1949.) **Tattooing of the thoroughbred and the prevention of fraud.**—*J. Amer. vet. med. Ass.* 114. 284-286. 2829

The Thoroughbred Racing Bureau of the U.S.A. instituted in 1946 the British Army method of tattooing, namely, on the inside of the upper lip. Details are given regarding the technique and the type of branding adopted by the Bureau. —J. G. O'SULLIVAN.

MISCELLANEOUS

I & II. DODD, F. H., & FOOT, A. S. (1949.) **Experiments on milking technique. III. Combined effect of reducing the milking time and washing the udder with hot water. IV. Effect of increasing the milking time.**—*J. Dairy Res.* 16. 14-22. 2831

I. Five groups of four cows each were used

JARL, F. (1946.) **Studies on monozygous cattle twins. VI. Investigations into the quantitative variation of ascorbic acid in the milk.**—*Ibid.* 207-238. 2828

IV. The literature regarding susceptibility to certain diseases in monozygous human twins is briefly reviewed. Two cases of mycotic enteritis in a pair of identical twin cows are then described. The source of infection was considered to be mouldy hay. As the same hay was being fed to seven other pairs of identical twins and also to 104 other cattle, none of which developed the disease, it was considered that the affected twins had an inherited sensitivity to the fungus.

V. An experiment over a period of 810 days on nine pairs of identical heifer twins is described. One heifer of each pair was fed on a high level of nutrition and the other on a low. The records of weights and of growth are tabulated and there are numerous photographs of the heifers at various ages. The rate of growth of the heifers on a high level of nutrition was, on an average, greater than those on a low level, but there were great differences between different pairs which are considered to be an expression of hereditary factors.

VI. The ascorbic acid content of the milk of six pairs of identical and four pairs of dissimilar cow twins was determined at intervals over a period of four years and the figures are tabulated and discussed. There was a definite seasonal fluctuation. A particularly high level was found in the milk of two dissimilar twins of a polled breed. These were the only representatives of this polled breed included in the experiment and it is not known whether a high ascorbic acid content is a characteristic of the milk of this particular breed.—M. C.

ANON. (1948.) **The cattle marking dye mystery is solved.**—*Fed. Vet.* 5. No. 1. p. 2. 2830

The preparation of a cattle marking fluid based on nyanzol D lumps (a proprietary dye) is described. The material is applied to the dry coat with a small brush, and it is claimed that marks remain legible for several months. Pigs can also be marked with it.—E. PARKER POLLARD.

to demonstrate the effects of hot and cold water washing of the udder before milking, together with machine milking for full time and for 60% of that time. The effects on milk yield and milk quality were studied, and a five-week treatment period was controlled by two periods of 14 days before and after. The only treatment which produced

an effect was the limitation of milking time which depressed the yield of the milk.

II. Another experiment using ten cows was conducted to find the effect of doubling normal

milking time; in this case the treatment produced no effect on either milk yield or milk quality.

—G. L. BAILEY

REPORTS

CANADA, BRITISH COLUMBIA. (1947.) **Report of the live stock branch.** [GUNN, W. R.] —*Rep. Dep. Agric. Brit. Columbia*, 1947. pp. 106-129. 2832

There is a general reduction in the numbers of horses. Many horses are going to processing plants for livestock feeding and for export shipments of horse meat. Light horse breeding is keen and there is a good demand for riding horses. The importation of suitable stallions is encouraged. All these animals must be registered pure-breds of breeds recognized by the Canadian National Live Stock Records and must pass inspection by a Dominion Stallion Inspector before being admitted.

Wild animals and sheep-killing dogs continue to be major problems in sheep farming. Many large range flocks have been disbanded and some of the range used has been taken over for cattle.

The situation is not satisfactory with regard to MASTITIS, which is responsible for more replacements in dairy herds than any other condition. In some areas up to 60% of animals are replaced annually. Only two small outbreaks of CASEOUS LYMPHADENITIS occurred and these were due to infected animals being imported into the Province. SWINE ERYSIPELAS appeared in an acute form.

There were fewer losses from HAEMORRHAGIC SEPTICAEMIA than in the previous year. Losses are mainly among cattle being transported from place to place. A calfhood vaccination programme against BRUCELLOSIS is being applied in addition to the tuberculin testing of cattle.

BLACKLEG is extending into new areas. Systematic and regular vaccination is advocated. Some progress has been made against FOOT ROT in sheep, but much remains to be done.

COCCIDIOSIS did not appear in epidemic form, but occurred sporadically during the winter. NECROTIC STOMATITIS is becoming more widely spread.

A few cases of EQUINE ENCEPHALOMYELITIS occurred. The disease was brought under control by vaccinating all equine animals in the infected areas.

SWINE RHINITIS is associated with malnutrition and bad sanitary conditions. The remedy appears to be to eliminate the pigs with abnormal heads and to apply a better system of hygiene and nutrition.

Of 489 premises inspected under the Milk Act administration 17 were graded A, 401 B, and

one grade C, and 70 ungraded. Most of those ungraded were on account of unsuitable premises. There are great difficulties in obtaining material to improve existing buildings or to erect new ones.

There are approximately 400 fur farms in the Province and it is hoped the Department responsible for administration of the Fur Farm Act will be able to help the industry by bringing diseases under control and carrying on research both on diseases and the problems of nutrition.—J. A. G.

SOUTH AUSTRALIA. (1948.) **Tenth Annual Report of the Council of the Institute of Medical and Veterinary Science, July 1947-June 1948.** pp. 19. Adelaide: K. M. Stevenson, Government Printer. 283

During the course of a large amount of routine diagnostic work several patients (abattoir or meat processing workers) were found to have Q fever, this being the first record of the disease in South Australia. A new disease of poultry was seen for the first time in S.A. It is characterized by degeneration of cardiac muscle and resembles "ENZOOTIC FATAL SYNCOPES" reported in New Zealand. A form of *Cl. welchii* ENTERO-INTOXICATION, not type D, was recorded in young calves. In sheep following Mule operation an outbreak resembling tetanus occurred. *Cl. tetani* was not isolated, but a STAPHYLOCOCCAL CEREBRO-MENINGITIS was present. CHRONIC SINUSITIS causing dyspnoea was seen in sheep.

The salmonella typing centre typed over 400 cultures from Australian sources.

Studies on antibiotics in Australian plants and fungi were continued on *Drosera peltata*, *Peltosiphonia pinifolius*, *Psalliota xanthoderma* (mushroom). There were investigations on the pleuropneumonia organisms, *Pseudomonas*, primary atypical pneumonia, poliomyelitis, Kaposi's vascular celliform eruption, leuro-encephalitis, vitamin excretion, lung histamine liberation, snake venom (administration of heparin with neo-antigen reduced mortality from venoms of black and tiger snakes), anti-coagulant and fibrinogen B.

Veterinary research dealt with MUSCULAR DYSTROPHY in lambs, MICROPHTHALMOS of pigs and studies on "normal" or average bacterial flora of the pig.—H. McL. GORDON.

SIERRA LEONE. (1947.) **Annual report of the Department of Agriculture for the year 1947** [GLANVILLE, R. R.] pp. 24. Freetown: Government Printer, Sierra Leone. London: Crown

Agents for the Colonies. 1s. 6d. Items of veterinary interest pp. 9, 18-20. 2834

There is no veterinary report and no section dealing specifically with animal husbandry and animal disease. An outbreak of BOVINE CONTAGIOUS PLEURO-PNEUMONIA among the animals on Teko Stock Farm caused losses of about 30%. Vaccine obtained from the Gold Coast was used. Losses occurred from PURULENT ENDOMETRITIS and also from fly worry due to mass attacks by *Stomoxys calcitrans*.

There is a large local demand for pigs for breeding purposes. The pig stock at Newton consists of Middle and Large White crosses. Large white boars and sows are being obtained from Nigeria and other white stock have been obtained from local service piggeries. With good feeding and management, as well as avoiding areas where tsetse fly occurs, and the use of fly-proof pens, it is hoped to maintain progress and extend the industry.

There is promise from results so far obtained at Newton of the rabbit industry being firmly established in the Colony.

Disease and thieving made the keeping of poultry and ducks unsuccessful at Newton.

The main Rhode Island Red breeding and distribution centre is at Njala. There is a big demand for eggs, chicks and adult birds, but until more is known about diseases prevalent in the Colony, and they are controlled, permanent improvement is doubtful. There were 400 birds at Njala and 6,926 eggs were produced in 1945. Other experimental stations have not been very successful with livestock or poultry.

The conditions are extremely difficult but the Department is making progress in spite of all these.—J. A. GRIFFITHS.

UGANDA PROTECTORATE. (1947.) **Annual Report of the Veterinary Department for the year ended 31st December 1945.** [MACKINTOSH, W. L. S.] pp. 16. Uganda: Govt. Printer. 1s. 2835

The outstanding feature of this report is the shortage of staff for the work to be done—equivalent to one officer per 600,000 head.

Sporadic cases of ANTHRAX and BLACKLEG occurred throughout the Protectorate. 13,000 cattle were given blackquarter vaccine.

Owing to a break in the quarantine measures BOVINE CONTAGIOUS PLEURO-PNEUMONIA spread from Karamoja, an endemic area. Three herds became infected. These cattle were slaughtered and near-by herds were inoculated.

The tsetse problem is largely a veterinary one, and anti-tsetse measures are directed by a committee of which the Director of Veterinary Services is a member. One-third of the land area of Uganda, much of it good grazing pasture, is

lost to cattle by the presence of tsetse fly, which continue to spread. Surveys to find the extent of tsetse fly and to design measures to prevent their advance into new areas is proving a difficult problem. TRYPANOSOMIASIS is mainly due, in cattle, to *Trypanosoma congolense*. *T. vivax* is common and has recently assumed a more virulent form. In one area 11,000 cattle died of the disease, many of them from *T. vivax* infection.

In treatment phenanthridinium 897 and stibophen, although curative in some cases, have been superseded by phenanthridinium 1553 which has marked trypanocidal effects against *T. congolense* and *T. vivax*. Field experiments are in operation. The latter drug in a 2% solution has been found to cause very severe local reactions when given subcutaneously. When used in 1% solutions and given intramuscularly there was no severe local reaction. It was found that in known *T. congolense* infections in cattle there were less than 10% relapses after one dose. In *T. vivax* infections of cattle 50% relapsed several months after treatment. The animals maintain condition and may ultimately recover. EAST COAST FEVER and other tick-borne diseases continue to cause severe losses among calves. Good management has reduced former mortality rates of 50%-80% to as low as an average of 3%.

Only one outbreak of FOOT AND MOUTH DISEASE occurred outside the endemic area (Karamoja).

RABIES is endemic in West Nile. There were 26 suspected cases.

The Protectorate remained comparatively free from RINDERPEST. Only two outbreaks occurred which were controlled by immunization of 15,000 cattle, outside the Karamoja District, where rinderpest and bovine contagious pleuropneumonia are endemic and no control measures have ever been attempted, owing to administrative difficulties. Experiments were made with chick embryo virus from Canada. Two hundred cattle inoculated in the West Nile District subsequently broke down when given Kenya goat virus, 100% reacting. In a second batch of 208 cattle at Nagongera 185 were tested with goat virus and subsequent reactions were considered satisfactory. Twenty-three were tested with bovine rinderpest virus and 17% reacted.

Military demands for livestock and the increased prices being offered necessitated control of the sale of native-owned animals. About 300,000 cattle and 600,000 sheep and goats were slaughtered during 1945. Pig-breeding is confined to the Buganda Province.

Milk production is not satisfactory in regard to quality, owing to adulteration. Much of the surplus milk is converted into butter or ghee.

Uganda is now exporting ghee of good quality whereas formerly 250 tons were imported annually. Two and a half tons of butter were produced in 1945 at Siroko Creamery.

Fewer hides and skins were exported, but quality improvement measures have been maintained in the densely populated districts and extended in the outlying areas. FOLLICULAR MANGE is the chief cause of the down-grading of hides and skins. 1,226 tons of hides and 582,927 skins were reported.

There is much yet to be done to improve methods of animal husbandry in the densely populated areas. A resident Assistant Veterinary Officer (a local graduate) is in each Livestock Improvement Area to advise and guide owners

of livestock. A committee elected by the livestock owners administers the scheme in each area.

16,999 specimens were examined by the laboratory service. Research was mainly directed to TRYPANOSOMIASIS, new investigations of its pathology and biochemistry and of the life history of *Trypanosoma congolense*.

The serum laboratory has not been in use since 1940. The Veterinary School at Kabete had nine students in residence throughout the year.

The livestock census totals are 2,293,740 cattle, 995,321 sheep; 2,148,533 goats and 23,158 pigs. 63,205 cattle were sold in the cattle markets, the total value being £330,895.

Castrations numbered 46,542 cattle and 16,117 sheep and goats.—J. A. GRIFFITHS.

BOOK REVIEWS

ZIETZSCHMANN, O., & NICKEL, R. (1947.) *Leitfaden der Anatomie der Haustiere. [Guide to the anatomy of domestic animals.]* pp. 112. Wolfenbüttel-Hannover: Wolfenbütteler Verlagsanstalt Ltd. 2836

Zietzschmann and Nickel, faced with the fact that few copies of accepted anatomical textbooks were available and reprinting was for the time being impossible, decided to produce a series of short unillustrated guides for the use of their students in post-war Hannover, the suggestion being that the student should prepare his own illustrations from epidiascope tracings, or free-hand from dissection, for use with this guide.

This volume covers the skeletal, muscular and visceral systems in précis form and is an excellent little book for the purpose for which it was intended, containing as it does the essentials of anatomy as presented in the well-known German books. It is of no direct value, however, to the reader who is able to obtain unabridged versions of anatomical books by these and other German authors.

The authors are to be congratulated on their effort to overcome this difficulty, and it is to be hoped their pupils will soon have access to the 1943 edition of Ellenberger and Baum edited by Zietzschmann.—C. W. OTTAWAY.

HUTYRA, F. v., MAREK, J., MANNINGER, R., & MOCZY, J. v. (1945.) *Spezielle Pathologie und Therapie der Haustiere. Vol. I. Infektionskrankheiten. Vol. II. Organkrankheiten. [Special pathology and therapeutics of domestic animals. Vol. I. Infectious diseases. Vol. II. Diseases of the organs.]* pp. xii + 790 & pp. xii + 1144. Jena: Gustav Fischer. 9th Edit. 2837

The preparation of this ninth German edition became necessary through the early exhaustion of

the previous one. A new co-author in the person of Professor J. v. Moczy assisted, although his name does not appear on the cover.

The text was prepared for printing in 1942, but wartime difficulties prevented the completion until 1945, so the material is now some seven years old. This shows itself chiefly in connexion with chemotherapy and antiparasitic treatment. About a dozen new diseases not previously described have been included in this ninth edition, but the surprising lack of information on that important disease bovine mastitis, which has quite characterized this encyclopedic work, is still a feature.

Incidentally, the fifth English edition now on sale was compiled from the eighth German edition, though some additional information from British and American sources was added. The ninth German edition therefore remains the most up-to-date version of this great book which will no doubt continue as a very important source of instruction to veterinary students and others.

The paper and quality of printing are of high standard.—J. E.

BLOOM, W. [M.D.; Professor of Anatomy, Department of Anatomy and Institute of Radiobiology and Biophysics, University of Chicago]. (1948.) *Histopathology of irradiation from external and internal sources.* pp. xxv + 808. New York; Toronto; London: McGraw-Hill Book Company, Inc. 48s. 2838

This volume, which is a report of three years of intensive war research directed by Bloom under the Manhattan Project and the United States Atomic Energy Commission, on the pathological changes resulting from various types of external and internal irradiations, is one of a series. The purpose of the investigation was to examine tissue changes taking place in animals killed at varying intervals after treatment with one or more applica-

tions of various radiations applied externally or internally. External irradiation was obtained by using X-rays, β -rays emitted by phosphorus 32, γ -rays released by radium and the atomic pile, fast neutrons produced by the cyclotron and atomic pile, and slow neutrons from the atomic pile. Internal irradiation was obtained by using radio-active isotopes emitting α , β and γ rays. With rare exceptions the methods of exposure to particular types of radiation and the calculation of dosages were kept constant. This is an important feature of the work, the authors having established a base line of the tissue changes following the action of a variety of agents given in accurate doses to several species of laboratory animals, those used being mostly mice and rats and a small number of rabbits and g. pigs. A vast amount of histological material was examined from most organs and tissues, using only one staining method (haematoxylin-eosin-azur II); autoradiographs were also used.

The volume is profusely illustrated mainly with photomicrographs. A few camera lucida drawings and coloured plates serve to indicate how much more satisfactory such illustrations are than photomicrographs.

In some respects the book is disappointing but the critic is disarmed by the statement of the merits and deficiencies of the work which are listed in the introduction. The research was a war-time project, the workers were set a problem and expected to work rapidly. They were kept on a narrow track and, although they acquired and have recorded a vast amount of data of a basic nature, there were many interesting problems which would no doubt have been studied if the authors had been free to do so. Thus, while the work is a valuable reference book for the specialist in a limited field, it offers hard reading for the general pathologist.—R. WILLIAMSON.

TAGAND, R., & BARONE, R. (1949.) *Abrégé de Névrologie du Cheval. [Abridged neurology of the horse.]* pp. 320. Lyon: Imprimerie des Beaux-Arts Camille Annequin. 2839

Although the authors present this work as an abridged description of the nervous system of the horse, it is in fact a fairly comprehensive contribution.

They commence, quite rightly, with the assumption that for full appreciation one must consider the development of the system. And although the pages dealing with embryology are too few, they enable the authors to draw evidence from comparative embryology in their description of form and function of adult structures, particularly in the brain.

The portion on the brain and cranial nerves occupies two-thirds of the book. The numerous

drawings fit well with the text and one appreciates the schematic representations of nerve tracts and position of ganglia based on the work of Dexler and others. Of particular worth is the drawing representing the continuity of white and grey matter giving origin to spinal and cranial nerves, which shows also their similarity in architectural pattern. A detailed study of the exact distribution of nerve tracts and ganglia in the horse is hardly within the scope of this book, but it is a study in need of clarification.

The spinal nerves are dealt with systematically. The description is good as a dissection discipline, but little reference is made to the clinical significance of their distribution. The autonomic system is adequately covered and drawings demonstrate the constitution of the main ganglia and plexuses.

It is a volume which should find its place in every dissection room and anatomical library and will be of great value to the French pupil. The specialized research worker will find benefit from its pages, but will perhaps have to look farther for a solution to his problems.—C. W. OTTAWAY.

ROSS, J. M. [M.D., B.S. (Lond.), M.R.C.S., L.R.C.P.; Adviser in Pathology to the Ministry of Supply]. (1948.) *Post-mortem appearances.* pp. ix + 308. London: Oxford University Press. 5th Edit. 8s. 6d. 2840

It is nine years since the fourth edition of this book was published. It is a most useful stand-by for ready reference and although written entirely for medical readers most of it is equally valuable to the veterinarian.

There are eleven chapters, followed by a further seven in an appendix, as follows: Death from causes other than disease; General metabolic and deficiency diseases; General infections; Diseases of the digestive system; Diseases of the kidney; Diseases of the respiratory system; Diseases of the ductless glands; Diseases of the blood and blood-forming organs; Diseases of the cardio-vascular system; Diseases of the nervous system; Still births and neonatal deaths; Anatomical normals (averages); Length and weight of foetus; Approximate weight of organs of newborn child; Dates of ossification of principal bones; Ages of eruption of teeth; Age of foetus; Changes in umbilical cord.

The book itself is of such small size that it can be slipped into a pocket and is designed to serve as a handy source of information to be kept within easy reach.

The text is condensed and lucid. There is a useful index, the print is clear and the manner in which it is arranged, with suitable headings and subheadings, is admirable. The paper is of good quality and the binding excellent.

MORGAN, B. B. [B.S., M.S., Ph.D.; Associate Professor of Veterinary Science, College of Agriculture, University of Wisconsin, Madison], & HAWKINS, P. A. [A.B., M.A., D.V.M.; Professor of Parasitology, School of Veterinary Medicine, Michigan State College, East Lansing]. (1949.) **Veterinary helminthology.** pp. ix + 400. Minneapolis, Minn.: Burgess Publishing Company. \$7.00. **2841**

This excellent text-book deals exclusively with the helminth diseases of domesticated animals with emphasis on those parasites that occur in the U.S.A. It is the outgrowth of lecture material used in teaching students at the University of Wisconsin and the Michigan State College and can be recommended for the use of students or as a book of reference for practising veterinarians. References are confined to those in the English language, but are adequate and much recent work up to 1946 is discussed.

The book is divided into sections each of which is concerned with a separate host; all the common domestic stock are included and there is a section on fur-bearing animals. There are over 50 plates, many of which give simple line drawings for species identification and are to be recommended for the absence of artistic embroidery which in some books tends to obscure the main detail.

There is a short general introduction to the subject of helminthology, followed by a section on

classification, with some typical life cycles. Each parasite is described with its synonyms, common (American) name, life history and pathogenicity and the treatment required for domestic stock.

In a work of this size it is inevitable that some errors should appear and they will be found both in the text and in the figures. From the reviewer's point of view the chief objection to the book is that the type is neither attractive nor easy to read. The material would have merited a worthier presentation.—S. BRIAN KENDALL.

BOUVIER, G., & GASCHEN, H. (1949.) **Guide d'entomologie médicale et vétérinaire. [Guide to medical and veterinary entomology.]** pp. 96. 18 figs. Lausanne: Librairie Payot. Swiss Fr. 5.— **2842**

While this inclusive survey of Arthropoda parasitic on man and domestic animals or noxious to them is too wide in its scope and compressed in space to permit keys or descriptions adequate for diagnosis, it provides an outline of the biology of the parasite concerned, of the damage it causes and of methods of control.

There is no new information, but it is of interest to read the authors' contention that the larvae of *Hypoderma lineatum* are swallowed and thus reach the oesophagus; this is not generally accepted. They also state that latent psoroptic otacariasis is the cause of relapses of sheep scab after treatment; this important fact is scarcely recognized in Britain.—T. SPENCE.

BOOKS RECENTLY RECEIVED

[Notice of recently received books in this list does not preclude review.]

GADDUM, J. H. (1949.) **Pharmacology.** pp. xvi + 504. London: Oxford University Press. 25s.

GILBERT, F. A. (1949.) **Mineral nutrition of plants and animals.** pp. xii + 181. Norman, Oklahoma: University of Oklahoma Press. \$2.75.

GRASHUIS, J., & DE MAN, T. J. (1947.) **De vitaminen in de veevoeding. [Vitamins in cattle feeding.]** pp. 64. Hoogland: Instituut voor Moderne Veevoeding "De Schothorst." F. 1.50.

LUCK, J. M., LORING, H. S., & MACKINNEY, G. (Edited by.) (1949.) **Annual review of biochemistry. Vol. XVIII.** pp. vi + 789. Stanford, California: Annual Reviews, Inc. \$6.00.

MANNU, A. (1948.) **Note di anatomia ed embriologia degli animali domestici. [Notes**

on the anatomy and embryology of domestic animals.] pp. 109. Bologna: Riccardo Patron. 2nd Edit. 500 L.

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